# Installation, Start-Up and Service Instructions

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## SAFETY CONSIDERATIONS

Installation and servicing of air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service air-conditioning equipment.

Untrained personnel can perform the basic maintenance functions of cleaning coils and filters and replacing filters. All other operations should be performed by trained service personnel. When working on air-conditioning equipment, observe precautions in the literature, tags and labels attached to the unit, and other safety precautions that may apply.

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguishers available for all brazing operations.

**⚠ WARNING**

Before performing service or maintenance operations on unit, turn off main power switch to unit. Electrical shock could cause personal injury.

**⚠ WARNING**

1. Improper installation, adjustment, alteration, service, or maintenance can cause property damage, personal injury, or loss of life. Refer to the User's Information Manual provided with this unit for more details.
2. Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

**What to do if you smell gas:**

1. DO NOT try to light any appliance.
2. DO NOT touch any electrical switch, or use any phone in your building.
3. IMMEDIATELY call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
4. If you cannot reach your gas supplier, call the fire department.

**⚠ WARNING**

Disconnect gas piping from unit when pressure testing at pressure greater than 0.5 psig. Pressures greater than 0.5 psig will cause gas valve damage resulting in hazardous condition. If gas valve is subjected to pressure greater than 0.5 psig, it *must* be replaced before use. When pressure testing field-supplied gas piping at pressures of 0.5 psig or less, a unit connected to such piping must be isolated by closing the manual gas valve(s).

IMPORTANT: Units have high ambient operating limits. If limits are exceeded, the units will automatically lock the compressor out of operation. Manual reset will be required to restart the compressor.

## INSTALLATION

### Step 1 — Provide Unit Support

ROOF CURB — Assemble or install accessory roof curb in accordance with instructions shipped with this accessory. See Fig. 1. Install insulation, cant strips, roofing, and counter flashing as shown. Ductwork can be installed to roof curb before unit is set in place. Curb must be level. This is necessary to permit unit drain to function properly. Unit leveling tolerance is $\pm\ ^1/_{16}$ in. per linear ft in any direction. Refer to Accessory Roof Curb Installation Instructions for additional information as required. When accessory roof curb is used, unit may be installed on class A, B, or C roof covering material.

*Instructions continued on page 3.*

| PKG. NO. REF. | CURB HEIGHT | DESCRIPTION |
|---|---|---|
| CRRFCURB010A00 | 1′-2″ (305) | Roof Curb 14″ High |
| CRRFCURB011A00 | 2′-0″ (610) | Roof Curb 24″ High |

MAXIMUM CURB LEVELING TOLERANCES

| UNIT | A | | B | |
|---|---|---|---|---|
| | DEG. | IN. | DEG. | IN. |
| ALL | .28 | .57 | .28 | .42 |

NOTES:
1. Roof curb accessory is shipped disassembled.
2. Dimensions in ( ) are in millimeters.
3. ⇨ Direction of airflow.
4. Roof curb: 14 ga. (VA03-56) stl.
5. To prevent the hazard of stagnant water build-up in the unit do not exceed curb leveling tolerances.
6. Clearance between unit base rail and curb flange is 1/4-in. (6 mm) on each side.

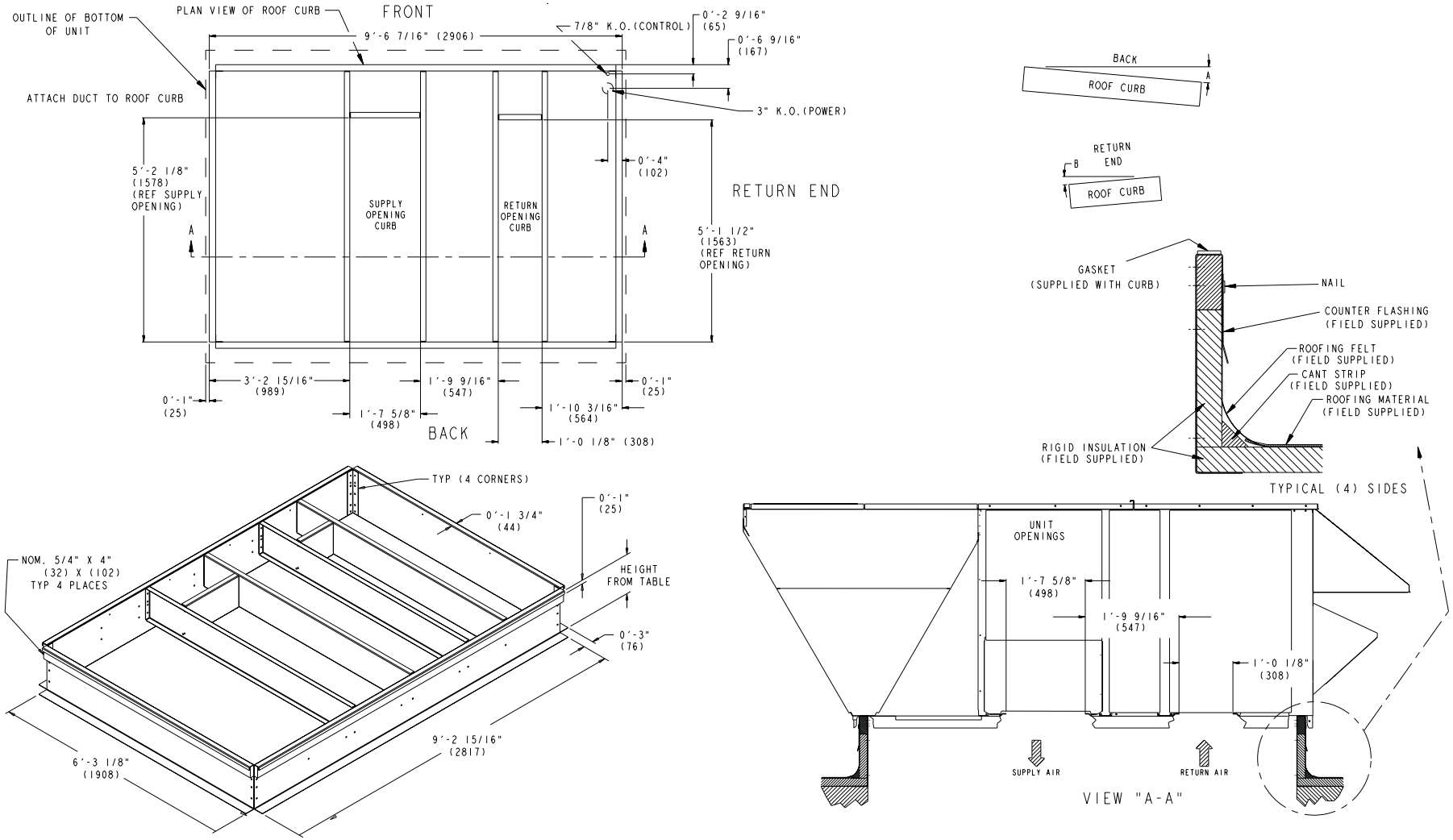



**Fig. 1 — Roof Curb Details**

IMPORTANT: The gasketing of the unit to the roof curb is critical for a watertight seal. Install gasket with the roof curb as shown in Fig. 1. Improperly applied gasket can also result in air leaks and poor unit performance.

ALTERNATE UNIT SUPPORT — When a curb cannot be used, install unit on a noncombustible surface. Support unit with sleepers, using unit curb support area. If sleepers cannot be used, support long sides of unit with a minimum of 3 equally spaced 4-in. x 4-in. pads on each side.

**Step 2 — Remove Shipping Rails —** Remove shipping rails prior to lowering unit onto roof curb. See Fig. 2. The rails are attached to the unit at both the return end and condenser end. Remove the screws from both ends of each rail. Be careful not to drop the rails onto any surface that could be damaged. Discard the rails. It is important to replace the screws into the unit to avoid any air or water leakage.

**⚠ CAUTION**

Do not allow the shipping rail to drop on the roof surface. Damage to the roof surface may result.

**Step 3 — Rig and Place Unit —** Inspect unit for transportation damage. File any claim with transportation agency.

Do not drop unit; keep upright. Use spreader bars over unit to prevent sling or cable damage. Rollers may be used to move unit across a roof. Level by using unit frame as a reference; leveling tolerance is $\pm$ $^1/_{16}$ in. per linear ft in any direction. See Fig. 3 for additional information. Unit operating weight is shown in Table 1.

Four lifting holes are provided in the unit base rails as shown in Fig. 3. Refer to rigging instructions on unit.

POSITIONING — Maintain clearance, per Fig. 4, around and above unit to provide minimum distance from combustible materials, proper airflow, and service access.

Do not install unit in an indoor location. Do not locate air inlets near exhaust vents or other sources of contaminated air. For proper unit operation, adequate combustion and ventilation air must be provided in accordance with Section 5.3 (Air for Combustion and Ventilation) of the National Fuel Gas Code, ANSI Z223.1 (American National Standards Institute).

Although unit is weatherproof, guard against water from higher level runoff and overhangs.

Locate mechanical draft system flue assembly at least 4 ft from any opening through which combustion products could enter the building, and at least 4 ft from any adjacent building. When unit is located adjacent to public walkways, flue assembly must be at least 7 ft above grade.

ROOF MOUNT — Check building codes for weight distribution requirements. Unit operating weight is shown in Table 1.

INSTALLATION ONTO CURB — The 48HG units are designed to fit on either the accessory full perimeter curb or onto existing 48/50TJ,HJ or 48/50DP,DR curbs. In either case, correct placement of the unit onto the curb is critical to operating performance. To aid in correct positioning, $^3/_8$-in. diameter locating holes have been added to the unit base rails. When placing the unit, these holes should line up with the roof curb edge as shown in Fig. 5 and 6, to assure proper duct opening alignment. Select the alignment holes suited for the curb being used. For installation on the HJ,TJ,DP,DR curb use the alignment holes located approximately 20-in. from the end of the base rail on the return end of the unit. For placement on the HG curb, use the alignment holes located approximately 2-in. from the end of the base rail on the return end of the unit. See labels on the side of the unit for more details.

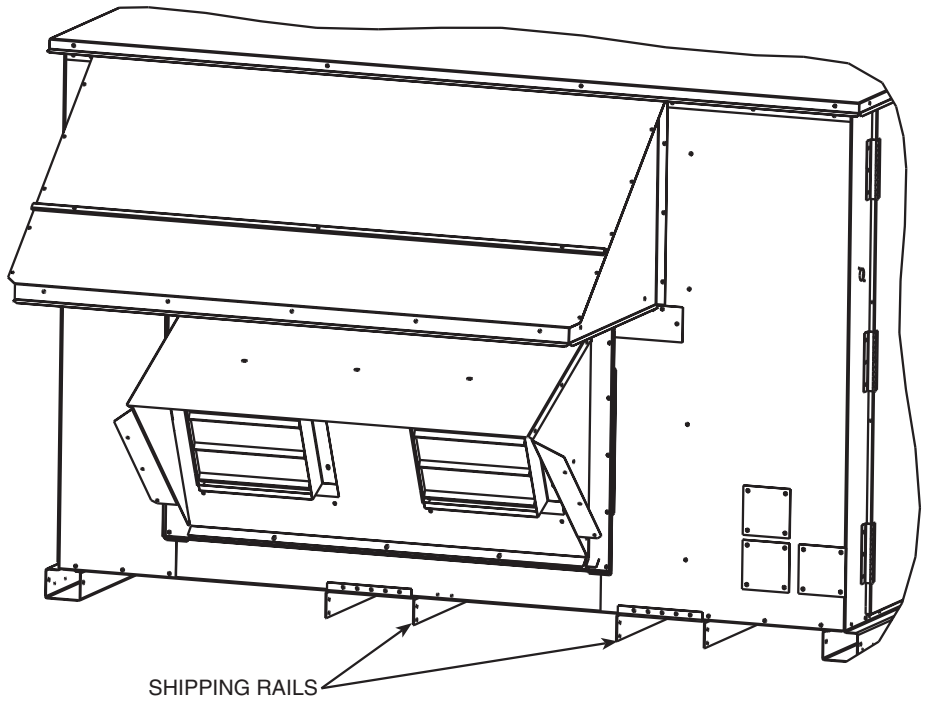


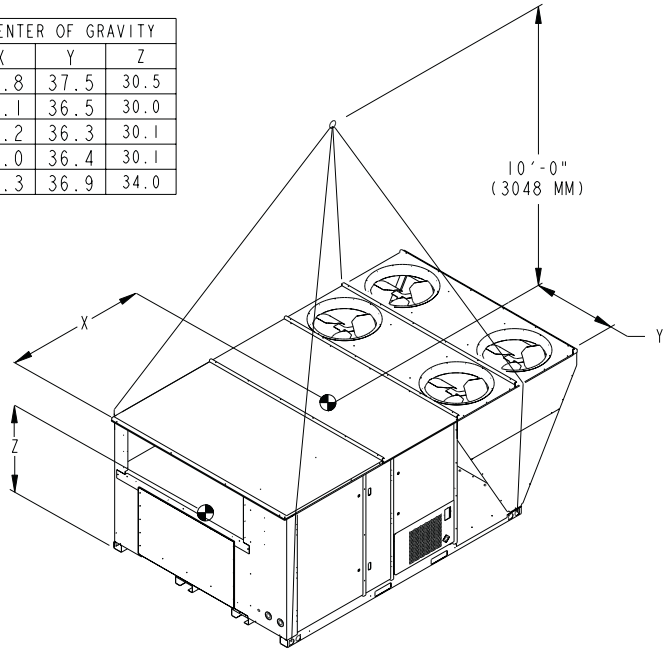

**Fig. 2 — Shipping Rail Removal**

# CAUTION - NOTICE TO RIGGERS:

ALL PANELS MUST BE IN PLACE WHEN RIGGING.

NOTICE TO RIGGERS: Rig by inserting hooks into unit base rails as shown. Maintain a distance of 120 inches (3048 MM) from top of unit to eyehook. Leave coil cover attached to unit while rigging to protect coil of unit from damage.

| 48/50 UNIT SIZE | MAX WEIGHT | CENTER OF GRAVITY | | |
|---|---|---|---|---|
| | | X | Y | Z |
| HG014 | 2792 | 61.8 | 37.5 | 30.5 |
| HG016 | 2915 | 61.1 | 36.5 | 30.0 |
| HG020 | 2943 | 61.2 | 36.3 | 30.1 |
| HG024 | 2991 | 61.0 | 36.4 | 30.1 |
| HG028 | 3211 | 65.3 | 36.9 | 34.0 |




NOTE:
SEE LABEL FOR UNIT LOCATION ON ROOF CURB

NOTE:
Add 150lb (68kg) for domestic crating.

50TG500606 | -

**Fig. 3 — Rigging Details**

| UNIT SIZE 48 | OPERATING WEIGHT LOW GAS (48HGD) | UNIT HEIGHT | CENTER OF GRAVITY LOCATION | | | CORNER WEIGHT LBS. [KG] | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | W | X | Y | Z | | | | |
| | LBS. [KG] | IN [MM] | IN [MM] | IN [MM] | IN [MM] | A | B | C | D |
| HG014 | 2102 [953] | 58-1/8 [1476] | 65-1/2 [1664] | 35 [889] | 30 [762] | 549 [249] | 703 [319] | 373 [169] | 477 [216] |
| HG016 | 2196 [996] | 58-1/8 [1476] | 64 [1626] | 34 [864] | 29-1/2 [749] | 599 [272] | 737 [334] | 386 [175] | 474 [215] |
| HG020 | 2224 [1008] | 58-1/8 [1476] | 64-1/2 [1638] | 33-1/2 [851] | 30 [762] | 610 [277] | 751 [341] | 387 [176] | 476 [216] |
| HG024 | 2272 [1030] | 58-1/8 [1476] | 64 [1626] | 34 [864] | 30 [762] | 625 [283] | 760 [345] | 400 [181] | 487 [221] |
| HG028 | 2526 [1146] | 70-1/8 [1781] | 68 [1727] | 34-1/2 [876] | 34-1/2 [876] | 662 [300] | 859 [390] | 434 [198] | 571 [260] |

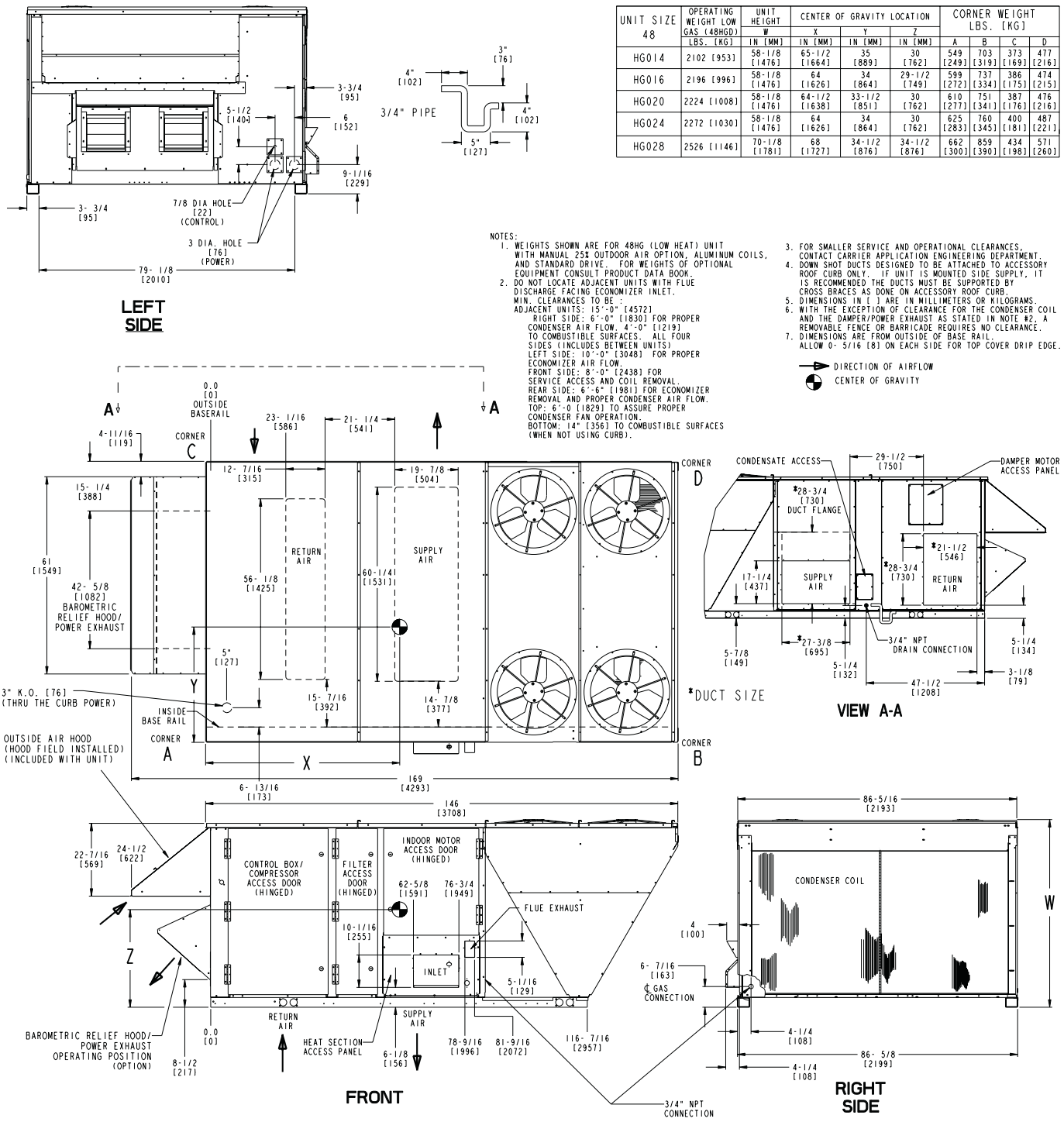

LEFT SIDE
3-3/4 [95]
5-1/2 [140]
6 [152]
9-1/16 [229]
3- 3/4 [95]
7/8 DIA HOLE [22] (CONTROL)
3 DIA. HOLE [76] (POWER)
79- 1/8 [2010]
3" [76]
4" [102]
3/4" PIPE
4" [102]
5" [127]
NOTES:
1. WEIGHTS SHOWN ARE FOR 48HG (LOW HEAT) UNIT WITH MANUAL 25% OUTDOOR AIR OPTION, ALUMINUM COILS, AND STANDARD DRIVE. FOR WEIGHTS OF OPTIONAL EQUIPMENT CONSULT PRODUCT DATA BOOK.
2. DO NOT LOCATE ADJACENT UNITS WITH FLUE DISCHARGE FACING ECONOMIZER INLET. MIN. CLEARANCES TO BE : ADJACENT UNITS: 15'-0" [4572] RIGHT SIDE: 6'-0" [830] FOR PROPER CONDENSER AIR FLOW. 4'-0" [1219] TO COMBUSTIBLE SURFACES. ALL FOUR SIDES (INCLUDES BETWEEN UNITS) LEFT SIDE: 10'-0" [3048] FOR PROPER ECONOMIZER AIR FLOW. FRONT SIDE: 8'-0" [2438] FOR SERVICE ACCESS AND COIL REMOVAL. REAR SIDE: 6'-6" [1981] FOR ECONOMIZER REMOVAL AND PROPER CONDENSER AIR FLOW. TOP: 6'-0 [1829] TO ASSURE PROPER CONDENSER FAN OPERATION. BOTTOM: 14" [356] TO COMBUSTIBLE SURFACES (WHEN NOT USING CURB).
3. FOR SMALLER SERVICE AND OPERATIONAL CLEARANCES, CONTACT CARRIER APPLICATION ENGINEERING DEPARTMENT.
4. DOWN SHOT DUCTS DESIGNED TO BE ATTACHED TO ACCESSORY ROOF CURB ONLY. IF UNIT IS MOUNTED SIDE SUPPLY, IT IS RECOMMENDED THE DUCTS MUST BE SUPPORTED BY CROSS BRACES AS DONE ON ACCESSORY ROOF CURB.
5. DIMENSIONS IN [ ] ARE IN MILLIMETERS OR KILOGRAMS.
6. WITH THE EXCEPTION OF CLEARANCE FOR THE CONDENSER COIL AND THE DAMPER/POWER EXHAUST AS STATED IN NOTE #2, A REMOVABLE FENCE OR BARRICADE REQUIRES NO CLEARANCE.
7. DIMENSIONS ARE FROM OUTSIDE OF BASE RAIL. ALLOW 0- 5/16 [8] ON EACH SIDE FOR TOP COVER DRIP EDGE.
DIRECTION OF AIRFLOW
CENTER OF GRAVITY
0.0 [0] OUTSIDE BASERAIL
CORNER C
CORNER D
CORNER A
CORNER B
4-11/16 [119]
23- 1/16 [586]
21- 1/4 [541]
12- 7/16 [315]
19- 7/8 [504]
15- 1/4 [388]
61 [1549]
42- 5/8 [1082] BAROMETRIC RELIEF HOOD/ POWER EXHAUST
RETURN AIR
SUPPLY AIR
56- 1/8 [1425]
60-1/4 [1531]
5" [127]
3" K.O. [76] (THRU THE CURB POWER)
INSIDE BASE RAIL
15- 7/16 [392]
14- 7/8 [377]
OUTSIDE AIR HOOD (HOOD FIELD INSTALLED) (INCLUDED WITH UNIT)
6- 13/16 [173]
169 [4293]
CONDENSATE ACCESS
29-1/2 [750]
DAMPER MOTOR ACCESS PANEL
*28-3/4 [730] DUCT FLANGE
17-1/4 [437]
SUPPLY AIR
*21-1/2 [546]
*28-3/4 [730]
RETURN AIR
*27-3/8 [695]
3/4" NPT DRAIN CONNECTION
5-7/8 [149]
5-1/4 [132]
5-1/4 [134]
3-1/8 [79]
47-1/2 [1208]
*DUCT SIZE
VIEW A-A
146 [3708]
22-7/16 [569]
24-1/2 [622]
CONTROL BOX/ COMPRESSOR ACCESS DOOR (HINGED)
FILTER ACCESS DOOR (HINGED)
INDOOR MOTOR ACCESS DOOR (HINGED)
62-5/8 [1591]
76-3/4 [1949]
FLUE EXHAUST
10-1/16 [255]
INLET
5-1/16 [129]
RETURN AIR
SUPPLY AIR
0.0 [0]
HEAT SECTION ACCESS PANEL
6-1/8 [156]
78-9/16 [1996]
81-9/16 [2072]
116- 7/16 [2957]
BAROMETRIC RELIEF HOOD/ POWER EXHAUST OPERATING POSITION (OPTION)
8-1/2 [217]
3/4" NPT CONNECTION
FRONT
86-5/16 [2193]
CONDENSER COIL
W
4 [100]
6- 7/16 [163]
GAS CONNECTION
4-1/4 [108]
86- 5/8 [2199]
4-1/4 [108]
RIGHT SIDE

**Fig. 4 — Base Unit Dimensions**

## Table 1 — Physical Data

| UNIT 48HG | | 014 | | 016 | | 020 | 024 | 028 |
|---|---|---|---|---|---|---|---|---|
| VOLTAGE | | 208/230, 460 | 575 | 208/230, 460 | 575 | ALL | ALL | ALL |
| NOMINAL CAPACITY (Tons) | | 12 1/2 | 12 1/2 | 15 | 15 | 18 | 20 | 25 |
| OPERATING WT (lbs) (Low Heat) | | 2102 | 2102 | 2196 | 2196 | 2224 | 2272 | 2526 |
| COMPRESSOR | | | | | | | | |
| Quantity | | 2 | 2 | 3 | 3 | 3 | 3 | 2 |
| Number of Refrigerant Circuits | | 2 | 2 | 3 | 3 | 3 | 3 | 2 |
| Oil (oz) Ckt A...Ckt B...Ckt C | | 54...54...NA | 54...54...NA | 68...68...68 | 68...68...68 | 68...68...90 | 90...90...90 | 110...110...NA |
| REFRIGERANT TYPE | | | | | R-22 | | | |
| Expansion Device | | TXV | TXV | TXV | TXV | TXV | TXV | TXV |
| Operating Charge (lbs) | | | | | | | | |
| Circuit A | | 19.6 | 19.6 | 13.2 | 13.2 | 13.1 | 13.8 | 21.8 |
| Circuit B | | 18.3 | 18.3 | 12.2 | 12.2 | 12.7 | 13.9 | 20.3 |
| Circuit C | | NA | NA | 15.4 | 15.4 | 15.2 | 15.5 | NA |
| CONDENSER COIL | | | | | | | | |
| Rows...Fins/in. | | 2...17 | 2...17 | 2...17 | 2...17 | 2...17 | 2...17 | 2...17 |
| Total Face Area (sq ft) | | 57.78 | 57.78 | 57.78 | 57.78 | 57.78 | 57.78 | 66.67 |
| CONDENSER FAN | | | | | | | | |
| Nominal Cfm (Total, all fans) | | 14,000 | 14,000 | 14,000 | 14,000 | 14,000 | 14,000 | 21,000 |
| Quantity...Diameter (in.) | | 4...22 | 4...22 | 4...22 | 4...22 | 4...22 | 4...22 | 6...22 |
| Motor Hp...Rpm | | 1/4...1100 | 1/4...1100 | 1/4...1100 | 1/4...1100 | 1/4...1100 | 1/4...1100 | 1/4...1100 |
| Watts Input (Total) | | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 2100 |
| EVAPORATOR COIL | | | | | | | | |
| Rows...Fins/in. | | 3...15 | 3...15 | 3...15 | 3...15 | 3...15 | 4...15 | 4...15 |
| Total Face Area (sq ft) | | 23.33 | 23.33 | 23.33 | 23.33 | 23.33 | 23.33 | 27.22 |
| EVAPORATOR FAN | | | | | | | | |
| Quantity...Size | | 2...15x11 | 2...15x11 | 2...15x11 | 2...15x11 | 2...15x11 | 2...15x11 | 2...15x11 |
| Type Drive | | Belt | Belt | Belt | Belt | Belt | Belt | Belt |
| Nominal Cfm | | 5000 | 5000 | 6000 | 6000 | 7000 | 8000 | 10,000 |
| Std Motor Hp | | 3.7 | 3 | 3.7 | 3 | 5 | 5 | 7 1/2 |
| Alt Motor Hp | | 5 | 5 | 5 | 5 | 7 1/2 | 7 1/2 | 10 |
| Motor Nominal Rpm | | 1725 | 1725 | 1725 | 1725 | 1725 | 1725 | 1725 |
| Std Max. Continuous Bhp | | 4.25 | 3.45 | 4.25 | 3.45 | 5.75 | 5.75 | 8.63 |
| Std Max. Continuous Watts | | 3171 | 2574 | 3171 | 2574 | 4290 | 4290 | 6438 |
| Alt Max. Continuous Bhp | | 5.75 | 5.75 | 5.75 | 5.75 | 8.63 | 8.63 | 11.50 |
| Alt Max. Continuous Watts | | 4290 | 4290 | 4290 | 4290 | 6438 | 6438 | 8579 |
| Motor Frame Size | Standard | 56HZ | 56H | 56HZ | 56H | S184T | S184T | S213T |
| Motor Frame Size | Alternate | S184T | 184T | S184T | 184T | S213T | S213T | S215T |
| Fan Drive Rpm Range | Std Motor/Std Drive | 485- 613 | 472- 619 | 618- 789 | 609- 778 | 658- 808 | 658- 808 | 799- 965 |
| | Std Motor/Alt Drive | 618- 789 | 609- 778 | 485- 613 | 472- 619 | 794- 974 | 794- 974 | 717- 882 |
| | Alt Motor/Std Drive | 778-1021 | 778-1021 | 778-1021 | 778-1021 | 949-1145 | 949-1145 | 939-1152 |
| | Alt Motor/Opt Drive | 1000-1227 | 1000-1227 | 1000-1227 | 1000-1227 | 1126-1328 | 1126-1328 | 1152-1366 |
| Motor Bearing Type | | Ball | Ball | Ball | Ball | Ball | Ball | Ball |
| Maximum Allowable Rpm | | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 |
| Motor Pulley Pitch Diameter | Std Motor/Std Drive | 3.7-4.7 | 3.1-4.1 | 3.4-4.4 | 3.4-4.4 | 4.3-5.3 | 4.3-5.3 | 5.4-6.6 |
| | Std Motor/Alt Drive | 3.4-4.4 | 3.4-4.4 | 3.7-4.7 | 3.1-4.1 | 4.3-5.3 | 4.3-5.3 | 5.4-6.6 |
| | Alt Motor/Std Drive | 3.1-4.1 | 3.1-4.1 | 3.1-4.1 | 3.1-4.1 | 5.4-6.6 | 5.4-6.6 | 4.2-5.2 |
| | Alt Motor/Opt Drive | 4.3-5.3 | 4.3-5.3 | 4.3-5.3 | 4.3-5.3 | 5.5-6.5 | 5.5-6.5 | 5.2-6.2 |
| Motor Shaft Diameter (in.) | Standard | 7/8 | 7/8 | 7/8 | 7/8 | 1 1/8 | 1 1/8 | 1 3/8 |
| Motor Shaft Diameter (in.) | Alternate | 1 1/8 | 1 1/8 | 1 1/8 | 1 1/8 | 1 3/8 | 1 3/8 | 1 3/8 |
| Belt, Quantity...Type...Length (in.) | Std Motor/Std Drive | 1...BX...51 | 1...BX...48 | 1...A..45 | 1...A...45 | 1...BX...46 | 1...BX...46 | 1...BX...51 |
| | Std Motor/Alt Drive | 1...A...45 | 1...A...45 | 1...BX...51 | 1...BX...48 | 1...BX...42 | 1...BX...42 | 1...BX...50 |
| | Alt Motor/Std Drive | 1...BX...38 | 1...BX...38 | 1...BX...38 | 1...BX...38 | 1...BX...46 | 1...BX...46 | 2...AX...42 |
| | Alt Motor/Opt Drive | 1...B...41 | 1...B..41 | 1...B...41 | 1...B...41 | 1...BX...42 | 1...BX...42 | 2...AX...42 |
| Pulley Center Line Distance (in.) | | 11.3-12.3 | 11.3-12.3 | 11.3-12.3 | 11.3-12.3 | 10.0-12.2 | 10.0-12.2 | 9.6-12.0 |
| Speed Change per Full Turn of | Std Motor/Std Drive | 21 | 25 | 29 | 28 | 25 | 25 | 28 |
| Moveable Pulley Flange (Rpm) | Std Motor/Alt Drive | 29 | 28 | 21 | 25 | 30 | 30 | 28 |
| | Alt Motor/Std Drive | 41 | 41 | 41 | 41 | 33 | 33 | 36 |
| | Alt Motor/Opt Drive | 38 | 38 | 38 | 38 | 34 | 34 | 36 |
| Moveable Pulley Maximum Full Turns from Closed Position | | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| Factory Speed Setting (Rpm) | | 549 | 546 | 704 | 694 | 733 | 733 | 882 |
| FURNACE SECTION | | | | | | | | |
| Rollout Switch Cutout Temp (F) | | 225 | 225 | 225 | 225 | 225 | 225 | 225 |
| Burner Orifice Diameter (in. — drill size) | | 0.136 — #29 | 0.136 — #29 | 0.136 — #29 | 0.136 — #29 | 0.136 — #29 | 0.136 — #29 | 0.136 — #29 |
| Gas | | Natural | Natural | Natural | Natural | Natural | Natural | Natural |
| Thermostat Heat Anticipator Setting | | | | | | | | |
| Stage 1 (amps) | | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 |
| Stage 2 (amps) | | 0.44 | 0.44 | 0.44 | 0.44 | 0.44 | 0.44 | 0.44 |
| Gas Input (Btuh) High Heat | Stage 1 | 224,000 | 224,000 | 317,000 | 317,000 | 317,000 | 317,000 | 317,000 |
| | Stage 2 | 296,000 | 296,000 | 400,000 | 400,000 | 400,000 | 400,000 | 400,000 |
| Efficiency (Steady State) % | Vertical | 82 | 82 | 82 | 82 | 82 | 82 | 82 |
| Temperature Rise Range | | 25-55 | 25-55 | 25-55 | 25-55 | 25-55 | 25-55 | 25-55 |
| Gas Input (Btuh) Low Heat | Stage 1 | 199,000 | 199,000 | 199,000 | 199,000 | 199,000 | 199,000 | 199,000 |
| | Stage 2 | 250,000 | 250,000 | 250,000 | 250,000 | 250,000 | 250,000 | 250,000 |
| Efficiency (Steady State) % | Vertical | 82 | 82 | 82 | 82 | 82 | 82 | 82 |
| Temperature Rise Range | | 15-45 | 15-45 | 15-45 | 15-45 | 15-45 | 15-45 | 15-45 |
| Manifold Pressure | | | | | | | | |
| Natural Gas (in. wg) | Vertical | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Natural Gas (in. wg) | Horizontal | 2.95 | 2.95 | 2.95 | 2.95 | 2.95 | 2.95 | 2.95 |
| Gas Valve Quantity | | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Gas Valve Pressure Range Min-Max Allowable | (in. wg) | 5.5-13.0 | 5.5-13.0 | 5.5-13.0 | 5.5-13.0 | 5.5-13.0 | 5.5-13.0 | 5.5-13.0 |
| | (psig) | .235-.469 | .235-.469 | .235-.469 | .235-.469 | .235-.469 | .235-.469 | .235-.469 |
| Field Gas Connection Size (in. FPT) | | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 |
| HIGH PRESSURE SWITCH (psig) | | | | | | | | |
| Cutout | | 426 | 426 | 426 | 426 | 426 | 426 | 426 |
| Reset (Auto) | | 320 | 320 | 320 | 320 | 320 | 320 | 320 |
| OUTDOOR AIR INLET SCREENS | | | | | | | | |
| Quantity...Size (in.) | | 3...20x25 | 3...20x25 | 3...20x25 | 3...20x25 | 3...20x25 | 3...20x25 | 3...20x25 |
| RETURN AIR FILTERS | | | | | | | | |
| Quantity...Size (in.) | | 9...16x25 | 9...16x25 | 9...16x25 | 9...16x25 | 9...16x25 | 9...16x25 | 9...18x24 |

LEGEND

**Al** — Aluminum
**Bhp** — Brake Horsepower
**TXV** — Thermostatic Expansion Valve

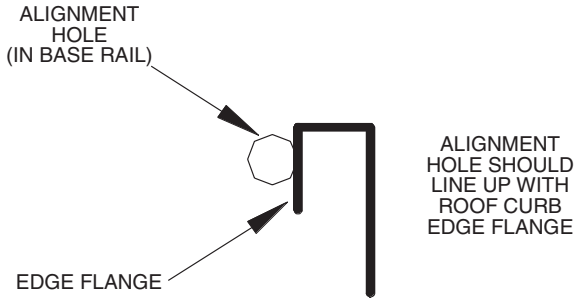



**Fig. 5 — Alignment Hole Details**

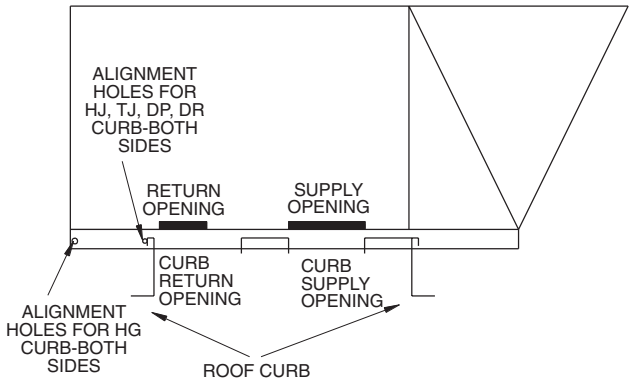



**Fig. 6 — Alignment Hole Location**

**Step 4 — Field Fabricate Ductwork —** Secure all ducts to building structure. Use flexible duct connectors between unit and ducts as required. Insulate and weatherproof all external ductwork, joints, and roof openings with counter flashing and mastic in accordance with applicable codes.

Ducts passing through an unconditioned space must be insulated and covered with a vapor barrier.

## Step 5 — Make Unit Duct Connections

DOWNSHOT CONFIGURATION — Unit is shipped for thru-the-bottom duct connections. Ductwork openings are shown in Fig. 1 and 4. Duct connections for downshot configuration are shown in Fig. 7. Field fabricated concentric ductwork may be connected as shown in Fig. 8 and 9. The unit is designed to attach the ductwork to the roof curb. Do not attach duct directly to the unit basepans.

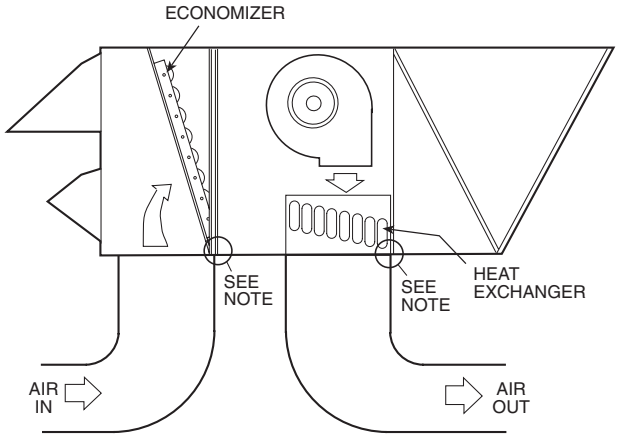
Unit basepans must be supported under the unit and around duct openings in order to prevent air leakage.

**⚠ WARNING**

For vertical supply and return units, tools or parts could drop into ductwork and cause an injury. Install a 90 degree turn in the return ductwork between the unit and the conditioned space. If a 90 degree elbow cannot be installed, then a grille of sufficient strength and density should be installed to prevent objects from falling into the conditioned space.

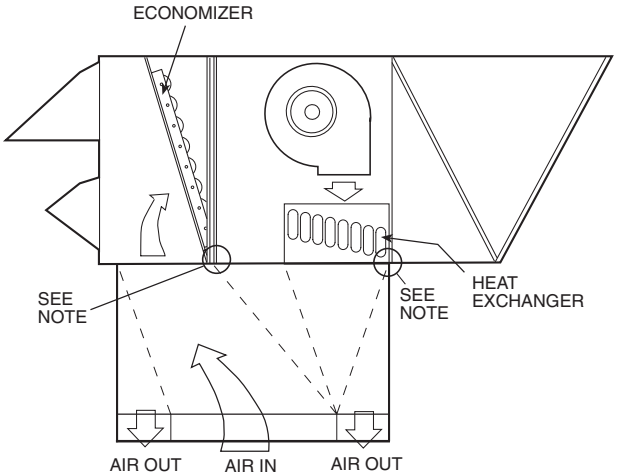
SIDE SHOT APPLICATIONS (HORIZONTAL) — Horizontal units are shipped with outer panels that allow for side by side horizontal duct connections. If specified during ordering, the unit will be shipped with the downshot duct openings blocked off from the factory, ready for side supply installation. If the side shot option was not specified at time of ordering the unit, a field-installed accessory kit is required to convert the downshot unit into a side supply configuration.

Installation of the duct block-off covers should be completed prior to placing the unit unless sufficient side clearance is available. A minimum of 66-in. is required between the unit and any obstruction to install the duct block-off covers. Side supply duct dimensions and locations are shown on Fig. 4. Install ductwork to horizontal duct flange connections on side of unit.



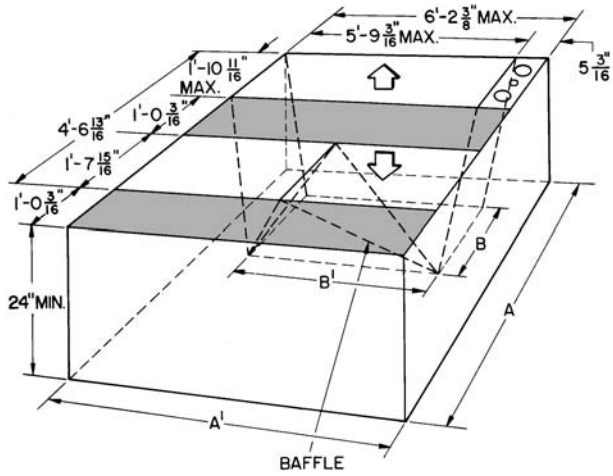

NOTE: Do not drill in this area; damage to basepan may result in water leak.

**Fig. 7 — Air Distribution — Thru-the-Bottom**




NOTE: Do not drill in this area; damage to basepan may result in water leak.

**Fig. 8 — Air Distribution — Concentric Duct**




NOTE: Dimensions A, A′, B, and B′ are obtained from field-supplied ceiling diffuser.

Shaded areas indicate block-off pans.

**Fig. 9 — Concentric Duct Details**

**Step 6 — Install Flue Hood and Inlet Hood —** Flue hood (smaller hood), inlet hood (larger hood), and screens are shipped inside the unit in the return air section. To install, remove the heat panel. The flue hood is attached to the heat section panel from the outside using the screws provided. See Fig. 10.

The inlet hood is installed by inserting the hood through the back of the heat panel. Attach the hood by inserting the screws provided through the clearance holes in the heat panel and into the intake hood.

Install the screens into both hoods using the screws and retaining nuts provided with the unit.

Attach the cover of the observation hole on the intake hood and then replace the heat panel onto the unit to complete the installation.

NOTE: When properly installed, the flue hood will line up with the combustion fan housing. See Fig. 11.

**Step 7 — Trap Condensate Drain —** See Fig. 12 for drain location. One 3/4-in. half coupling is provided outside unit evaporator section for condensate drain connection. A trap at least 4-in. deep must be used. See Fig. 13.

**Step 8 — Install Gas Piping —** Unit is equipped for use with natural gas. Installation must conform with local building codes or, in the absence of local codes, with the National Fuel Gas Code, ANSI Z223.1.

Install field-supplied manual gas shutoff valve with a 1/8-in. NPT pressure tap for test gage connection at unit. Field gas piping must include sediment trap and union. See Fig. 14.

**⚠ WARNING**

Do not pressure test gas supply while connected to unit. Always disconnect union before servicing.

IMPORTANT: Natural gas pressure at unit gas connection must not be less than 5.5 in. wg or greater than 13.5 in. wg.

Size gas-supply piping for 0.5-in. wg maximum pressure drop. Do not use supply pipe smaller than unit gas connection.

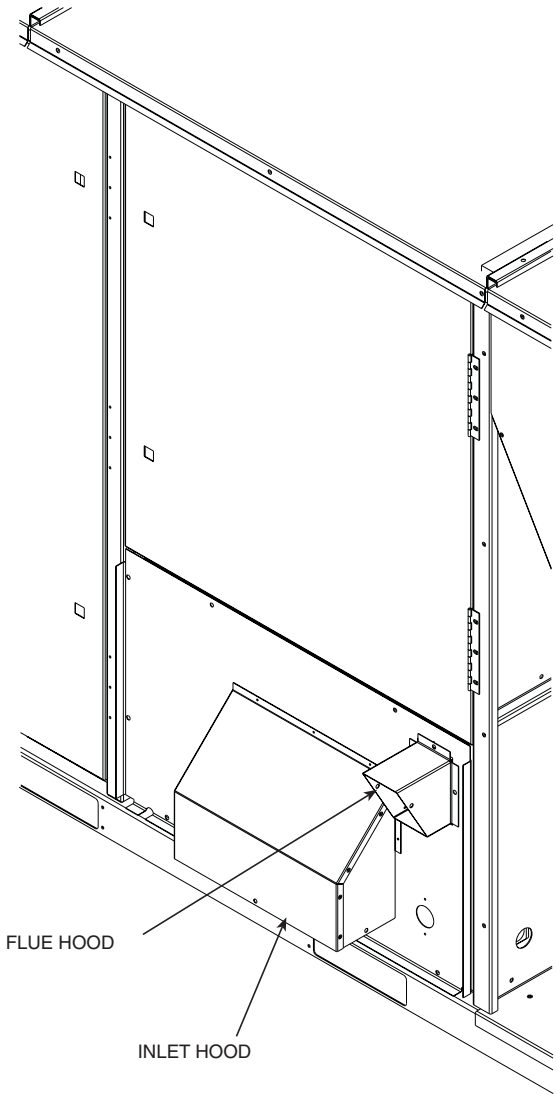



**Fig. 10 — Flue and Inlet Hood Locations**

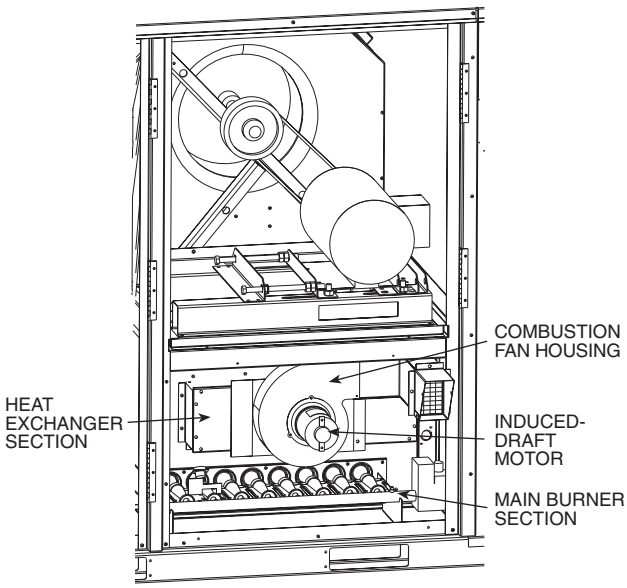



**Fig. 11 — Combustion Fan Housing Location**

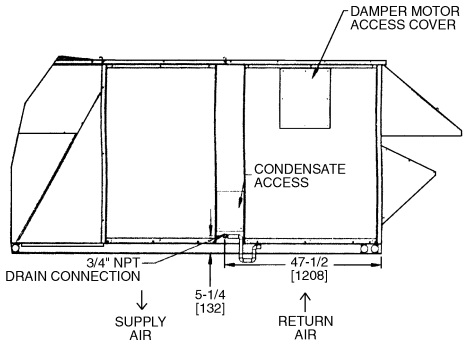



**Fig. 12 — Condensate Drain Details**

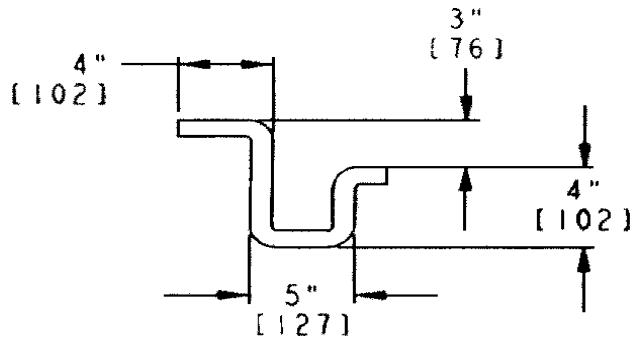



**Fig. 13 — Condensate Drain Piping Details**

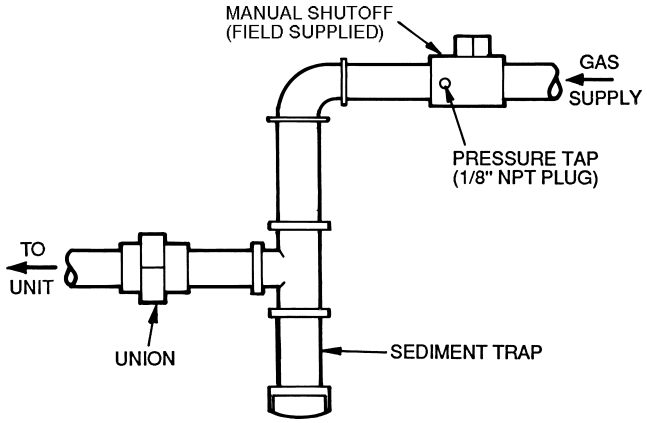



**Fig. 14 — Field Gas Piping**

## Step 9 — Make Electrical Connections

FIELD POWER SUPPLY — Unit is factory wired for voltage shown on unit nameplate.

When installing units, provide a disconnect per NEC (National Electrical Code) requirements of adequate size (Tables 2A and 2B).

All field wiring must comply with NEC and local requirements.

Route power and ground lines through control box end panel or unit basepan (see Fig. 4) to connections as shown on unit wiring diagram and Fig. 15.

**⚠ CAUTION**

The correct power phasing is critical to the operation of the scroll compressors. An incorrect phasing will result in an alarm being generated and compressor operation lockout. Should this occur, power phase correction must be made to the incoming power.

**⚠ WARNING**

The unit must be electrically grounded in accordance with local codes and NEC ANSI/NFPA 70 (National Fire Protection Association).

Field wiring must conform to temperature limitations for type ''T'' wire. All field wiring must comply with NEC and local requirements.

Operating voltage to compressor must be within voltage range indicated on unit nameplate. On 3-phase units, voltages between phases must be balanced within 2%.

Unit failure as a result of operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components.

FIELD CONTROL WIRING — Unit can be controlled with either a Carrier-approved accessory thermostat or a Carrier-approved space temperature sensor. Install thermostat according to the installation instructions included with accessory. Locate thermostat assembly or space temperature sensor on a solid interior wall in the conditioned space to sense average temperature.

Route thermostat or space temperature sensor cable or equivalent single leads of colored wire from subbase terminals through conduit into unit to low-voltage connections as shown on unit label wiring diagram and in Fig. 16 or 17.

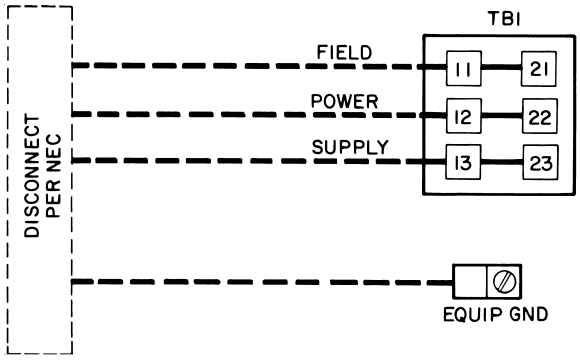
NOTE: For wire runs up to 50 ft, use no. 18 AWG (American Wire Gage) insulated wire (35 C minimum). For 50 to 75 ft, use no. 16 AWG insulated wire (35 C minimum). For over 75 ft, use no. 14 AWG insulated wire (35 C Minimum).

All wire larger than no. 18 AWG cannot be directly connected at the thermostat and will require a junction box and splice at the thermostat.

Set heat anticipator settings as follows:

| VOLTAGE | STAGE 1 (W1) ON | STAGE 1 AND 2 (W1 AND W2) ON |
|---|---|---|
| All | 0.15 | 0.30 |

Settings may be changed slightly to provide a greater degree of comfort for a particular installation.




LEGEND

**EQUIP** — Equipment
**GND** — Ground
**NEC** — National Electrical Code
**TB** — Terminal Board

NOTE: The maximum wire size for TB1 is 2/0.

**Fig. 15 — Field Power Wiring Connections**

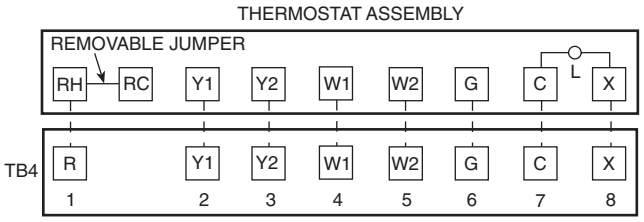
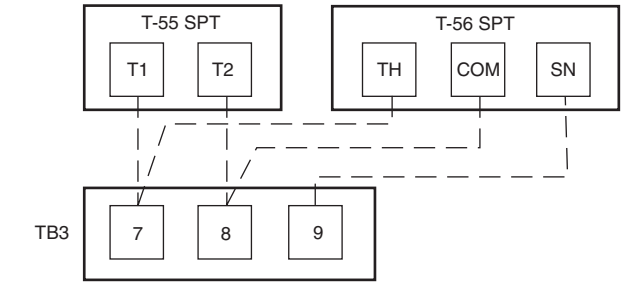



**Fig. 16 — Field Control Thermostat Wiring**




**SPT —** Space Temperature Sensor

**Fig. 17 — Field Control Space Temperature Sensor Wiring**

**Step 10 — Install Outdoor Air Hood —** Perform the following procedure to install the outdoor-air hood:

1. Remove blank panel from return end of unit (hood section). Save the screws. See Fig. 18 for shipping location of components.
2. Hood sides are fastened to sides of outdoor air opening. Remove the hood sides and save the screws (3 each side).
3. Remove the bracket holding the bottom half of the hood in the shipping position. Remove the hood bottom half and filters (or manual dampers on units so equipped) from outdoor section.
4. Remove inner filter track from shipping position in outdoor section. Position inner filter track so the track is facing outward from the unit. Install the filter track with 4 screws provided.
5. Apply seal strip (provided) to back flange of both hood sides where hood side connects to the unit back panel. See Fig. 19.
6. Apply seal strip (provided) to top flange of both hood sides where hood sides connect to the hood top panels. See Fig. 19.
7. Install hood sides to the back panels using the screws from Step 2. The sloped flanges point outward. The drip edges of the side panels should face outward as well. See Fig. 19.
8. Install the filter guides to the hood sides. The flanges should face inward to hold the filters in place. See Fig. 19.
9. Apply seal strip along the entire length of the bottom flange of the hood top. See Fig. 19.
10. Install the bottom part of the hood top using 4 screws provided. See Fig. 19.
11. Remove the packaging from filters (3) and install into the filter tracks. Slide the filters to the sides then place the last filter into the center of the filter track.

NOTE: For units with manual dampers, replace the end filters with the manual dampers. Install the filter in the center between the manual dampers.

12. Install the filter retainer track along the bottom edge of the outdoor air hood using 4 screws provided. See Fig. 19.
13. Install top section of the outdoor air hood using 6 screws provided. See Fig. 19. See Fig. 20 for a picture of the assembled outdoor air hood.

NOTE: For filter removal, remove the four screws holding the filter retainer. The filters can then be removed, cleaned, or replaced. Install the filters by reversing the procedure.

MANUAL DAMPER ASSEMBLY — For units equipped with manual dampers, the assembly process is similar to the outdoor air hood for units with economizers. There are two slide dampers shipped with the unit to allow for manual setting of the outside air volume. When assembling the hood, place one of the manual slide dampers in each of the end positions and the remaining filter in the center position. The manual dampers can then be moved to the appropriate position and then locked into place using the screws mounted in the adjustment slots. See Fig. 21.

**Step 11 — Make Outdoor-Air Inlet Adjustments —** A configuration within the unit software specifies the minimum economizer position when the indoor fan is operating. The following steps specify how to adjust the position of the economizer damper using the *Comfort*Link™ scrolling marquee display in order to determine the minimum economizer position that satisfies the consumer's requirement for percentage of outdoor air. Refer to the *Comfort*Link Display Usage section on page 40 for more information.

1. Enter the Service Test main menu on the display.
2. Enter the TEST submenu and turn ON test mode. If the submenu password has not already been entered, the password must be entered in order to turn ON Service Test. The default password is 1111.
3. Return to the main level of Service Test.
4. Enter the outputs (OUTS) submenu and turn on the IDF.
5. Return to the OUTS submenu and enter an initial value for the minimum economizer position (ECON). This will drive the economizer damper to the specified position. Continue to adjust the ECON value until the airflow requirements are met. Record the economizer position that satisfies the airflow requirements.
6. Return to the TEST submenu and turn OFF test mode. This will cause the economizer to close and the indoor fan to turn off.
7. Return to the main menu level and enter the Configuration menu.
8. Enter the economizer (ECON) submenu.
9. The MIN.P configuration represents the minimum economizer position. Enter the value determined during Step 5.

## Table 2A — Electrical Data (Units Without Optional Convenience Outlet)

| UNIT SIZE 48HG | NOMINAL VOLTAGE (3 Ph, 60 Hz) | VOLTAGE RANGE | | COMPRESSOR | | | | | | OFM | | | IFM | | POWER EXHAUST | | | COMBUSTION FAN MOTOR | POWER SUPPLY | | DISCONNECT SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | No. 1 | | No. 2 | | No. 3 | | | | | | | | | | | | | |
| | | Min | Max | RLA | LRA | RLA | LRA | RLA | LRA | Qty | Hp | FLA (ea) | Hp | FLA | Qty | Hp | FLA (ea) | FLA | MCA | MOCP* | FLA |
| 014 | 208/230 | 187 | 253 | 19.2 | 146.0 | 19.2 | 146.0 | — | — | 4 | 1/4 | 1.5 | 3.7 | 10.6/ 9.6 | — | — | — | .45/.52 | 60/ 59 | 70/ 70 | 70/ 70 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 5.9 | | 72/ 71 | 90/ 90 | 80/ 80 |
| | | | | | | | | | | | | | 5.0 | 16.7/15.2 | — | — | — | | 66/ 65 | 80/ 80 | 80/ 70 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 5.9 | | 78/ 77 | 90/ 90 | 90/ 90 |
| | 460 | 414 | 506 | 9.5 | 73.0 | 9.5 | 73.0 | — | — | 4 | 1/4 | 0.7 | 3.7 | 4.8 | — | — | — | 0.3 | 29 | 35 | 35 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 35 | 40 | 40 |
| | | | | | | | | | | | | | 5.0 | 7.6 | — | — | — | | 32 | 40 | 35 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 38 | 45 | 45 |
| | 575 | 518 | 633 | 7.6 | 58.4 | 7.6 | 58.4 | — | — | 4 | 1/4 | 0.7 | 3.0 | 3.9 | — | — | — | 0.3 | 24 | 30 | 30 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 30 | 35 | 35 |
| | | | | | | | | | | | | | 5.0 | 6.1 | — | — | — | | 26 | 30 | 30 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 33 | 40 | 40 |
| 016 | 208/230 | 187 | 253 | 16.0 | 125.0 | 16.0 | 125.0 | 16.0 | 125.0 | 4 | 1/4 | 1.5 | 3.7 | 10.6/ 9.6 | — | — | — | .45/.52 | 69/ 68 | 80/ 80 | 80/ 80 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 5.9 | | 81/ 80 | 90/ 90 | 90/ 90 |
| | | | | | | | | | | | | | 5.0 | 16.7/15.2 | — | — | — | | 75/ 74 | 90/ 80 | 90/ 90 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 5.9 | | 87/ 86 | 100/100 | 100/100 |
| | 460 | 414 | 506 | 8.0 | 60.0 | 8.0 | 60.0 | 8.0 | 60.0 | 4 | 1/4 | 0.7 | 3.7 | 4.8 | — | — | — | 0.3 | 34 | 40 | 40 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 40 | 45 | 45 |
| | | | | | | | | | | | | | 5.0 | 7.6 | — | — | — | | 37 | 40 | 40 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 43 | 50 | 50 |
| | 575 | 518 | 633 | 7.0 | 55.0 | 7.0 | 55.0 | 7.0 | 55.0 | 4 | 1/4 | 0.7 | 3.0 | 3.9 | — | — | — | 0.3 | 30 | 35 | 35 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 36 | 40 | 40 |
| | | | | | | | | | | | | | 5.0 | 6.1 | — | — | — | | 32 | 35 | 35 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 38 | 45 | 45 |
| 020 | 208/230 | 187 | 253 | 16.0 | 125.0 | 16.0 | 125.0 | 21.5 | 166.0 | 4 | 1/4 | 1.5 | 5.0 | 16.7/15.2 | — | — | — | .45/.52 | 82/ 81 | 100/100 | 90/ 90 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 5.9 | | 94/ 92 | 110/110 | 110/110 |
| | | | | | | | | | | | | | 7.5 | 24.2/22 | — | — | — | | 90/ 88 | 110/100 | 100/100 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 5.9 | | 102/ 99 | 125/110 | 125/110 |
| | 460 | 414 | 506 | 8.0 | 60.0 | 8.0 | 60.0 | 10.7 | 83.0 | 4 | 1/4 | 0.7 | 5.0 | 7.6 | — | — | — | 0.3 | 40 | 50 | 45 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 46 | 50 | 60 |
| | | | | | | | | | | | | | 7.5 | 11.0 | — | — | — | | 44 | 50 | 50 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 50 | 60 | 60 |
| | 575 | 518 | 633 | 7.0 | 55.0 | 7.0 | 55.0 | 8.6 | 66.0 | 4 | 1/4 | 0.7 | 5.0 | 6.1 | — | — | — | 0.3 | 34 | 40 | 40 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 40 | 45 | 45 |
| | | | | | | | | | | | | | 7.5 | 9.0 | — | — | — | | 37 | 45 | 40 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 43 | 50 | 50 |
| 024 | 208/230 | 187 | 253 | 21.5 | 166.0 | 21.5 | 166.0 | 21.5 | 166.0 | 4 | 1/4 | 1.5 | 5.0 | 16.7/15.2 | — | — | — | .45/.52 | 93/ 92 | 110/110 | 110/100 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 5.9 | | 105/103 | 125/110 | 125/125 |
| | | | | | | | | | | | | | 7.5 | 24.2/22.0 | — | — | — | | 101/ 99 | 125/110 | 110/110 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 5.9 | | 113/110 | 125/125 | 125/125 |
| | 460 | 414 | 506 | 10.7 | 83.0 | 10.7 | 83.0 | 10.7 | 83.0 | 4 | 1/4 | 0.7 | 5.0 | 7.6 | — | — | — | 0.3 | 45 | 50 | 50 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 52 | 60 | 60 |
| | | | | | | | | | | | | | 7.5 | 11.0 | — | — | — | | 49 | 50 | 60 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 55 | 60 | 70 |
| | 575 | 518 | 633 | 8.6 | 66.0 | 8.6 | 66.0 | 8.6 | 66.0 | 4 | 1/4 | 0.7 | 5.0 | 6.1 | — | — | — | 0.3 | 37 | 45 | 45 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 43 | 50 | 50 |
| | | | | | | | | | | | | | 7.5 | 9.0 | — | — | — | | 40 | 45 | 45 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 46 | 50 | 60 |
| 028 | 208/230 | 187 | 253 | 47.1 | 245.0 | 47.1 | 245.0 | — | — | 6 | 1/4 | 1.5 | 7.5 | 24.2/22.0 | — | — | — | .45/.52 | 140/137 | 175/175 | 150/150 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 5.9 | | 151/149 | 175/175 | 175/175 |
| | | | | | | | | | | | | | 10.0 | 30.8/28.0 | — | — | — | | 146/143 | 175/175 | 175/175 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 5.9 | | 158/155 | 200/200 | 175/175 |
| | 460 | 414 | 506 | 19.6 | 125.0 | 19.6 | 125.0 | — | — | 6 | 1/4 | 0.7 | 7.5 | 11.0 | — | — | — | 0.3 | 60 | 70 | 70 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 66 | 80 | 80 |
| | | | | | | | | | | | | | 10.0 | 14.0 | — | — | — | | 63 | 80 | 70 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 69 | 80 | 80 |
| | 575 | 518 | 633 | 15.8 | 100.0 | 15.8 | 100.0 | — | — | 6 | 1/4 | 0.7 | 7.5 | 9.0 | — | — | — | 0.3 | 49 | 60 | 60 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 55 | 70 | 60 |
| | | | | | | | | | | | | | 10.0 | 11.0 | — | — | — | | 51 | 60 | 60 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 57 | 70 | 70 |

## Table 2B — Electrical Data (Units Without Optional Convenience Outlet)

| UNIT SIZE 48HG | NOMINAL VOLTAGE (3 Ph, 60 Hz) | VOLTAGE RANGE | | COMPRESSOR | | | | | | OFM | | | IFM | | POWER EXHAUST | | | COMBUSTION FAN MOTOR | POWER SUPPLY | | DISCONNECT SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | No. 1 | | No. 2 | | No. 3 | | | | | | | | | | | | | |
| | | Min | Max | RLA | LRA | RLA | LRA | RLA | LRA | Qty | Hp | FLA (ea) | Hp | FLA | Qty | Hp | FLA (ea) | FLA | MCA | MOCP* | FLA |
| 014 | 208/230 | 187 | 253 | 19.2 | 146.0 | 19.2 | 146.0 | — | — | 4 | 1/4 | 1.5 | 3.7 | 10.6/ 9.6 | — | — | — | .45/.52 | 65/ 64 | 80/ 80 | 70/ 70 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 5.9 | | 77/ 76 | 90/ 90 | 90/ 90 |
| | | | | | | | | | | | | | 5.0 | 16.7/15.2 | — | — | — | | 71/ 70 | 90/ 80 | 80/ 80 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 5.9 | | 83/ 82 | 100/100 | 100/ 90 |
| | 460 | 414 | 506 | 9.5 | 73.0 | 9.5 | 73.0 | — | — | 4 | 1/4 | 0.7 | 3.7 | 4.8 | — | — | — | 0.3 | 32 | 40 | 35 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 38 | 45 | 45 |
| | | | | | | | | | | | | | 5.0 | 7.6 | — | — | — | | 35 | 40 | 40 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 41 | 50 | 45 |
| | 575 | 518 | 633 | 7.6 | 58.4 | 7.6 | 58.4 | — | — | 4 | 1/4 | 0.7 | 3.0 | 3.9 | — | — | — | 0.3 | 27 | 30 | 30 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 34 | 40 | 40 |
| | | | | | | | | | | | | | 5.0 | 6.1 | — | — | — | | 29 | 35 | 35 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 36 | 45 | 40 |
| 016 | 208/230 | 187 | 253 | 16.0 | 125.0 | 16.0 | 125.0 | 16.0 | 125.0 | 4 | 1/4 | 1.5 | 3.7 | 10.6/ 9.6 | — | — | — | .45/.52 | 74/ 73 | 90/ 80 | 90/ 80 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 5.9 | | 86/ 85 | 100/100 | 100/100 |
| | | | | | | | | | | | | | 5.0 | 16.7/15.2 | — | — | — | | 80/ 79 | 90/ 90 | 90/ 90 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 5.9 | | 92/ 91 | 100/100 | 110/100 |
| | 460 | 414 | 506 | 8.0 | 60.0 | 8.0 | 60.0 | 8.0 | 60.0 | 4 | 1/4 | 0.7 | 3.7 | 4.8 | — | — | — | 0.3 | 37 | 40 | 45 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 43 | 50 | 50 |
| | | | | | | | | | | | | | 5.0 | 7.6 | — | — | — | | 40 | 45 | 45 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 46 | 50 | 60 |
| | 575 | 518 | 633 | 7.0 | 55.0 | 7.0 | 55.0 | 7.0 | 55.0 | 4 | 1/4 | 0.7 | 3.0 | 3.9 | — | — | — | 0.3 | 33 | 35 | 40 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 40 | 45 | 45 |
| | | | | | | | | | | | | | 5.0 | 6.1 | — | — | — | | 35 | 40 | 40 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 42 | 50 | 50 |
| 020 | 208/230 | 187 | 253 | 16.0 | 125.0 | 16.0 | 125.0 | 21.5 | 166.0 | 4 | 1/4 | 1.5 | 5.0 | 16.7/15.2 | — | — | — | .45/.52 | 87/ 86 | 100/100 | 100/100 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 5.9 | | 99/ 97 | 110/110 | 110/110 |
| | | | | | | | | | | | | | 7.5 | 24.2/22.0 | — | — | — | | 95/ 93 | 110/110 | 110/110 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 5.9 | | 107/104 | 125/125 | 125/125 |
| | 460 | 414 | 506 | 8.0 | 60.0 | 8.0 | 60.0 | 10.7 | 83.0 | 4 | 1/4 | 0.7 | 5.0 | 7.6 | — | — | — | 0.3 | 43 | 50 | 50 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 49 | 50 | 60 |
| | | | | | | | | | | | | | 7.5 | 11.0 | — | — | — | | 47 | 50 | 60 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 53 | 60 | 60 |
| | 575 | 518 | 633 | 7.0 | 55.0 | 7.0 | 55.0 | 8.6 | 66.0 | 4 | 1/4 | 0.7 | 5.0 | 6.1 | — | — | — | 0.3 | 37 | 45 | 45 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 43 | 50 | 50 |
| | | | | | | | | | | | | | 7.5 | 9.0 | — | — | — | | 40 | 45 | 45 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 46 | 50 | 60 |
| 024 | 208/230 | 187 | 253 | 21.5 | 166.0 | 21.5 | 166.0 | 21.5 | 166.0 | 4 | 1/4 | 1.5 | 5.0 | 16.7/15.2 | — | — | — | .45/.52 | 98/ 97 | 110/110 | 110/110 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 5.9 | | 110/108 | 125/125 | 125/125 |
| | | | | | | | | | | | | | 7.5 | 24.2/22.0 | — | — | — | | 106/104 | 125/125 | 125/125 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 5.9 | | 118/115 | 125/125 | 150/150 |
| | 460 | 414 | 506 | 10.7 | 83.0 | 10.7 | 83.0 | 10.7 | 83.0 | 4 | 1/4 | 0.7 | 5.0 | 7.6 | — | — | — | 0.3 | 48 | 50 | 60 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 55 | 60 | 60 |
| | | | | | | | | | | | | | 7.5 | 11.0 | — | — | — | | 52 | 60 | 60 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 58 | 60 | 70 |
| | 575 | 518 | 633 | 8.6 | 66.0 | 8.6 | 66.0 | 8.6 | 66.0 | 4 | 1/4 | 0.7 | 5.0 | 6.1 | — | — | — | 0.3 | 40 | 45 | 45 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 47 | 50 | 60 |
| | | | | | | | | | | | | | 7.5 | 9.0 | — | — | — | | 43 | 50 | 50 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 49 | 50 | 60 |
| 028 | 208/230 | 187 | 253 | 47.1 | 245.0 | 47.1 | 245.0 | — | — | 6 | 1/4 | 1.5 | 7.5 | 24.2/22.0 | — | — | — | .45/.52 | 145/142 | 175/175 | 175/175 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 5.9 | | 156/154 | 200/200 | 175/175 |
| | | | | | | | | | | | | | 10.0 | 30.8/28.0 | — | — | — | | 151/148 | 175/175 | 175/175 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 5.9 | | 163/160 | 200/200 | 175/175 |
| | 460 | 414 | 506 | 19.6 | 125.0 | 19.6 | 125.0 | — | — | 6 | 1/4 | 0.7 | 7.5 | 11.0 | — | — | — | 0.3 | 63 | 80 | 70 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 69 | 80 | 80 |
| | | | | | | | | | | | | | 10.0 | 14.0 | — | — | — | | 66 | 80 | 70 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 72 | 90 | 80 |
| | 575 | 518 | 633 | 15.8 | 100.0 | 15.8 | 100.0 | — | — | 6 | 1/4 | 0.7 | 7.5 | 9.0 | — | — | — | 0.3 | 52 | 60 | 60 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 58 | 70 | 70 |
| | | | | | | | | | | | | | 10.0 | 11.0 | — | — | — | | 54 | 60 | 60 |
| | | | | | | | | | | | | | | | 2 | 1.0 | 3.1 | | 60 | 70 | 70 |

## LEGEND AND NOTES FOR TABLES 2A AND 2B

LEGEND

**FLA** — Full Load Amps
**HACR** — Heating, Air Conditioning and Refrigeration
**IFM** — Indoor (Evaporator) Fan Motor
**LRA** — Locked Rotor Amps
**MCA** — Minimum Circuit Amps
**MOCP** — Maximum Overcurrent Protection
**NEC** — National Electrical Code
**OFM** — Outdoor (Condenser) Fan Motor
**RLA** — Rated Load Amps

*Fuse or HACR circuit breaker.

NOTES:

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   *Never operate a motor where a phase imbalance in supply voltage is greater than 2%.* Use the following formula to determine the percent voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

EXAMPLE: Supply voltage is 460-3-60.

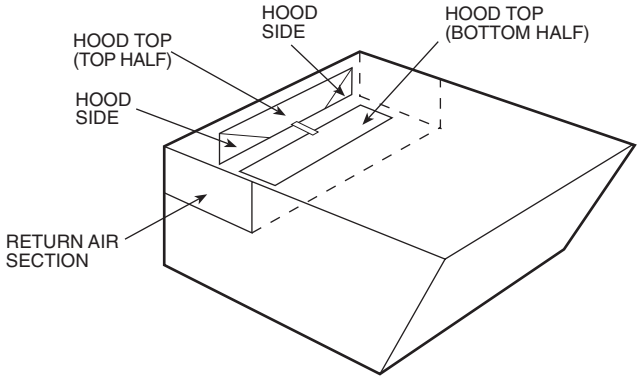
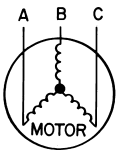



**Fig. 18 — Outdoor-Air Hood Component Shipping Location**




AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3} = \frac{1371}{3} = 457$$

Determine maximum deviation from average voltage.
(AB) 457 - 452 = 5 v
(BC) 464 - 457 = 7 v
(AC) 457 - 455 = 2 v

Maximum deviation is 7 v.

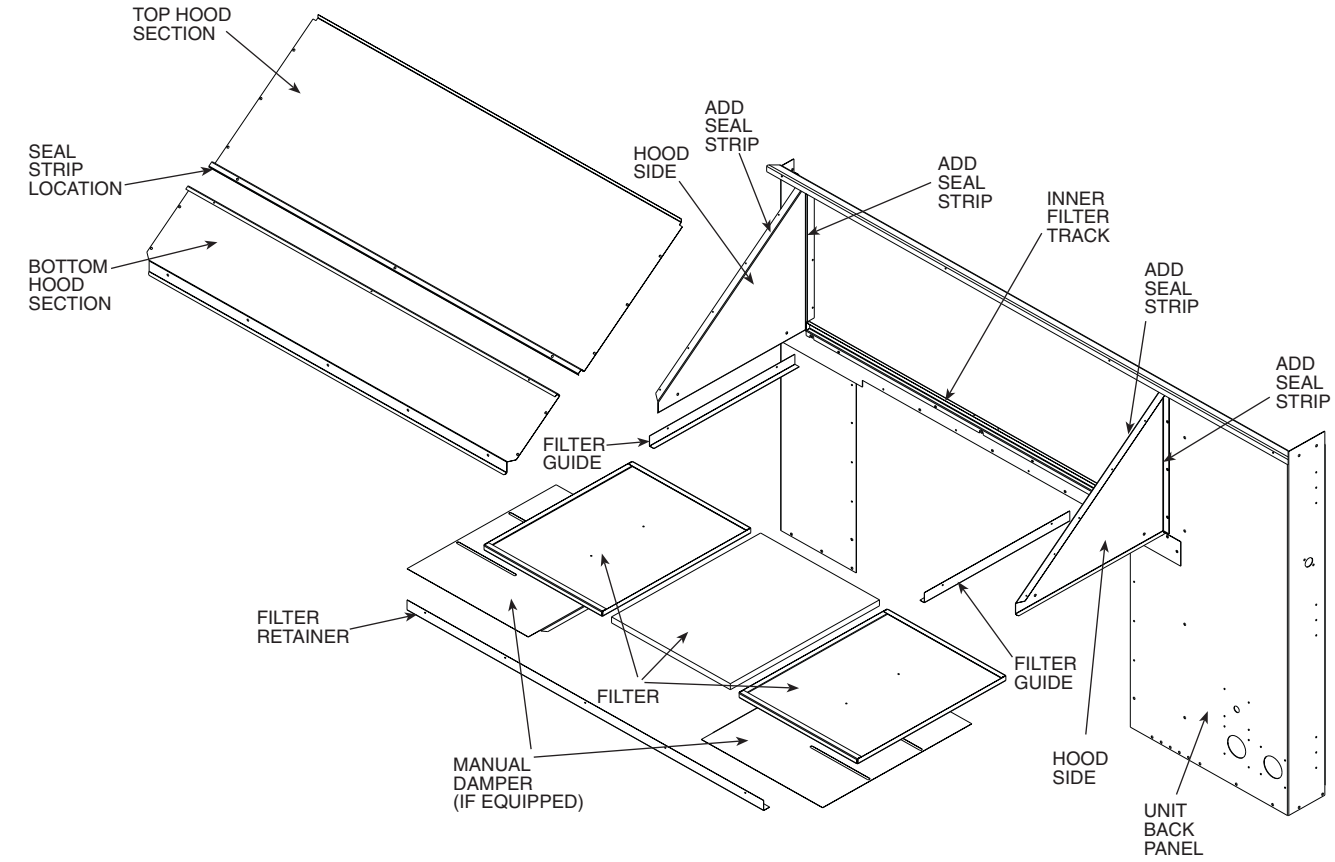
Determine percent voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{7}{457} = 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

3. The convenience outlet full load amps (FLA) are 5, 3, and 3 for 208/230, 460, 575-V units, respectively.




NOTE: Units with manual damper only use one filter.

**Fig. 19 — Outdoor-Air Hood Details**

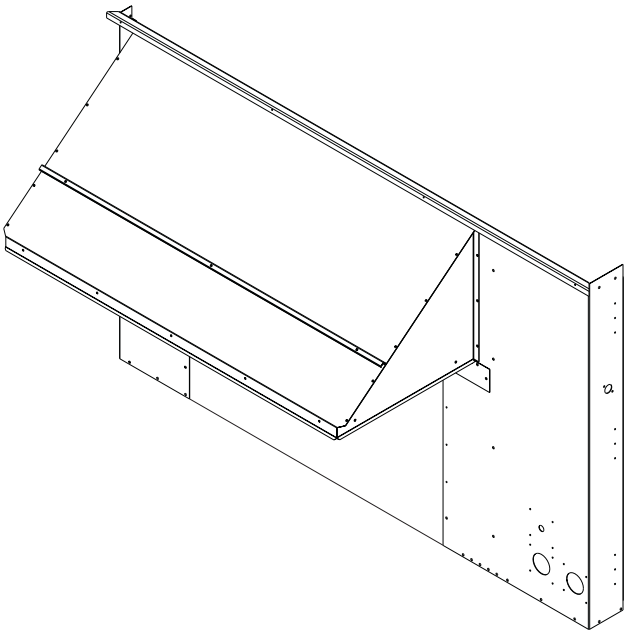


**Fig. 20 — Outdoor-Air Hood Assembled**

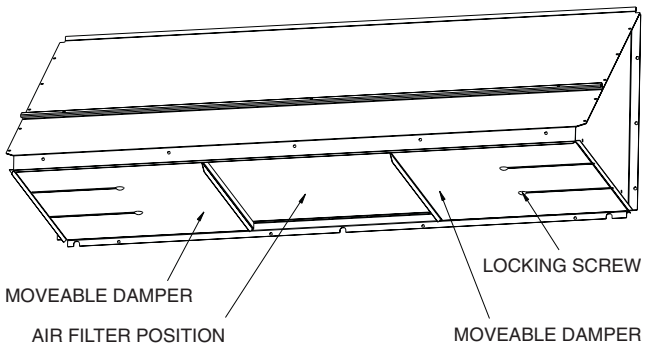



**Fig. 21 — Manual Damper Details**

**Step 12 — Position Optional Power Exhaust or Barometric Relief Damper Hood —** The optional power exhaust or barometric relief dampers are shipped assembled and tilted back into the unit for shipping. Brackets and extra screws are shipped in shrink wrap around the dampers.

1. Remove 9 screws holding each damper assembly in place. See Fig. 22. Each damper assembly is secured with 3 screws on each side and 3 screws along the bottom. Save screws.

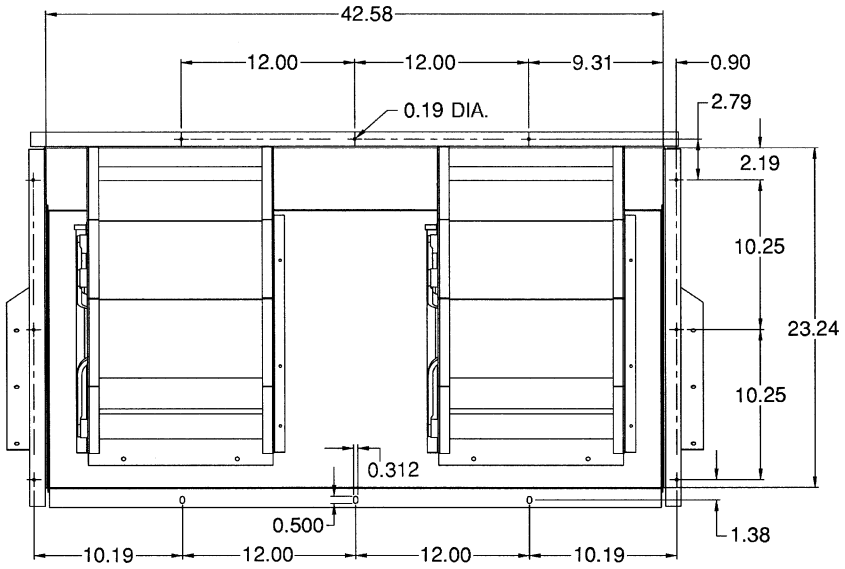
**⚠ CAUTION**

Be careful when tilting blower assembly. Hoods and blowers are heavy and can cause injury if dropped.

2. Pivot each damper assembly outward until edges of damper assembly rest against inside wall of unit.
3. Secure each damper assembly to unit with 6 screws across top (3 screws provided) and bottom (3 screws from Step 1) of damper.
4. With screws saved from Step 1, install brackets on each side of damper assembly.
5. Remove tape from damper blades.

**Step 13 — Install All Accessories —** After all of the factory-installed options have been adjusted, install all field-installed accessories. Refer to the accessory installation instructions included with each accessory. Consult the Carrier Price Pages for accessory package numbers for particular applications. The available field-installed accessories for the Centurion units are:

- economizer
- power exhaust
- barometric relief damper
- 14-in. roof curb
- 24-in. roof curb
- enthalpy control
- differential enthalpy control
- plugged filter indicator
- LP (liquified propane) conversion kit
- carbon dioxide detector
- smoke detector
- filter status switch
- fan status switch
- 65% pleated filters
- condenser hail guard
- horizontal duct accessory
- thermostats
- humidistats
- two-position damper




NOTES:
1. Unless otherwise specified, all dimensions are to outside of part.
2. Dimensions are in inches.

**Fig. 22 — Power Exhaust or Barometric Relief Damper Mounting Details**

## START-UP

Use the following information and Start-Up Checklist on page CL-1 to check out unit PRIOR to start-up.

**Unit Preparation —** Check that unit has been installed in accordance with these installation instructions and all applicable codes.

**Compressor Mounting —** Compressors are internally spring mounted. Do not loosen or remove compressor hold-down bolts.

**Refrigerant Service Ports —** Each refrigerant system has a total of 3 Schrader-type service gage ports per circuit. One port is located on the suction line, one on the compressor discharge line, and one on the liquid line. Be sure that caps on the ports are tight.

**Crankcase Heater(s) —** Crankcase heaters are energized as long as there is power to the unit and the compressor is not operating.

IMPORTANT: Unit power must be on for 24 hours prior to start-up. Otherwise, damage to compressor may result.

### Compressor Rotation

**⚠ CAUTION**

Improper wiring will cause compressor stoppage and alarm. Correct wiring by switching leads at contactor.

It is important to be certain the compressors are rotating in the proper direction. To determine whether or not compressors are rotating in the proper direction perform the following procedure:

1. Use the Service Test feature to energize a compressor (see Controls and Troubleshooting literature for details).
2. If the compressor is rotating in the wrong direction, the control will stop the compressor and an alarm will be displayed.

   NOTE: The evaporator fan is probably also rotating in the wrong direction.
3. Turn off power to the unit and lock out the power.
4. Reverse any two of the incoming power leads.
5. Turn on power to the unit.
6. Repeat the procedure to energize each compressor and check the evaporator fan rotation.

**Internal Wiring —** Check all electrical connections in unit control boxes; tighten as required.

**Evaporator Fan —** Fan belt and variable pulleys are factory-installed. Remove tape from the fan pulley. See Tables 3-23 for Fan Performance Data. Be sure that fans rotate in the proper direction. See Table 24 for air quantity limits. See Table 25 and 26 for Evaporator Fan Motor Specifications. See Table 27 for fan rpm at various motor pulley settings. To alter fan performance, see Evaporator Fan Performance Adjustment section on page 42.

**Condenser-Fans and Motors —** Condenser fans and motors are factory set. Refer to Condenser-Fan Adjustment section (page 42) as required.

**Return-Air Filters —** Check that correct filters are installed in filter tracks (see Table 1). Do not operate unit without return-air filters.

**Outdoor-Air Inlet Screens —** Outdoor-air inlet screens must be in place before operating unit.

**Gas Heat —** Verify gas pressures before turning on heat as follows:

1. Turn off manual gas stop.
2. Connect pressure gage to supply gas pressure tap (see Fig. 14).
3. Connect pressure gage to manifold pressure tap on gas valve.
4. Turn on manual gas stop and set thermostat to HEAT position. After the unit has run for several minutes, verify that incoming pressure is 5.5 in. wg to 13.0 in. wg, and that the manifold pressure is 2.95 in. wg. on horizontal discharge applications and 3.00 in. wg on vertical discharge applications. If manifold pressure must be adjusted, refer to Gas Valve Adjustment section on page 43.
5. After unit has been in operation for 5 minutes, check temperature rise across the heat exchangers. See unit informative plate for correct rise limits of the heat supplied. Air quantities may need to be adjusted to bring the actual rise to within the allowable limits.

## Table 3 — Fan Performance — 48HGD014 (Low Heat Units) — Vertical Discharge Units*

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.2 | | | 0.4 | | | 0.6 | | | 0.8 | | | 1.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **3500** | 460 | 591 | 0.68 | 548 | 774 | 0.89 | 623 | 951 | 1.09 | 692 | 1126 | 1.29 | 755 | 1301 | 1.50 |
| **4000** | 499 | 774 | 0.89 | 581 | 976 | 1.12 | 653 | 1170 | 1.35 | 717 | 1361 | 1.56 | 777 | 1551 | 1.78 |
| **4500** | 538 | 990 | 1.14 | 617 | 1212 | 1.39 | 685 | 1423 | 1.64 | 746 | 1630 | 1.88 | 803 | 1835 | 2.11 |
| **5000** | 579 | 1243 | 1.43 | 654 | 1485 | 1.71 | 719 | 1715 | 1.97 | 778 | 1938 | 2.23 | 832 | 2158 | 2.48 |
| **5500** | 621 | 1536 | 1.77 | 693 | 1798 | 2.07 | 755 | 2045 | 2.35 | 811 | 2285 | 2.63 | 864 | 2520 | 2.90 |
| **6000** | 664 | 1871 | 2.15 | 732 | 2152 | 2.48 | 792 | 2417 | 2.78 | 846 | 2673 | 3.07 | 897 | 2925 | 3.36 |
| **6500** | 707 | 2250 | 2.59 | 772 | 2550 | 2.93 | 830 | 2834 | 3.26 | 883 | 3106 | 3.57 | 932 | 3373 | 3.88 |
| **7000** | 751 | 2676 | 3.08 | 813 | 2994 | 3.44 | 869 | 3295 | 3.79 | 920 | 3585 | 4.12 | 967 | 3868 | 4.45 |
| **7500** | 795 | 3150 | 3.62 | 855 | 3487 | 4.01 | 909 | 3805 | 4.38 | 958 | 4112 | 4.73 | 1004 | 4411 | 5.07 |
| **8000** | 839 | 3676 | 4.23 | 897 | 4029 | 4.63 | 949 | 4366 | 5.02 | 997 | 4689 | 5.39 | 1042 | 5004 | 5.75 |
| **8500** | 884 | 4253 | 4.89 | 940 | 4625 | 5.32 | 990 | 4978 | 5.73 | 1037 | 5318 | 6.12 | 1080 | 5649 | 6.50 |

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.2 | | | 1.4 | | | 1.6 | | | 1.8 | | | 2.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **3500** | 814 | 1476 | 1.70 | 871 | 1650 | 1.90 | 924 | 1825 | 2.10 | 975 | 1999 | 2.30 | 1023 | 2173 | 2.50 |
| **4000** | 834 | 1740 | 2.00 | 888 | 1930 | 2.22 | 939 | 2119 | 2.44 | 988 | 2308 | 2.65 | 1035 | 2497 | 2.87 |
| **4500** | 857 | 2039 | 2.35 | 909 | 2243 | 2.58 | 958 | 2446 | 2.81 | 1005 | 2650 | 3.05 | 1051 | 2853 | 3.28 |
| **5000** | 884 | 2376 | 2.73 | 933 | 2594 | 2.98 | 980 | 2811 | 3.23 | 1026 | 3028 | 3.48 | 1070 | 3244 | 3.73 |
| **5500** | 913 | 2753 | 3.17 | 960 | 2984 | 3.43 | 1006 | 3215 | 3.70 | 1049 | 3445 | 3.96 | 1092 | 3674 | 4.23 |
| **6000** | 945 | 3172 | 3.65 | 990 | 3417 | 3.93 | 1034 | 3662 | 4.21 | 1076 | 3905 | 4.49 | 1117 | 4147 | 4.77 |
| **6500** | 978 | 3636 | 4.18 | 1022 | 3895 | 4.48 | 1064 | 4153 | 4.78 | 1104 | 4409 | 5.07 | 1144 | 4665 | 5.37 |
| **7000** | 1012 | 4145 | 4.77 | 1055 | 4419 | 5.08 | 1095 | 4691 | 5.39 | 1135 | 4960 | 5.70 | 1173 | 5229 | 6.01 |
| **7500** | 1047 | 4703 | 5.41 | 1089 | 4992 | 5.74 | 1128 | 5277 | 6.07 | 1167 | 5561 | 6.40 | 1204 | 5842 | 6.72 |
| **8000** | 1084 | 5311 | 6.11 | 1124 | 5615 | 6.46 | 1163 | 5915 | 6.80 | 1200 | 6211 | 7.14 | 1236 | 6506 | 7.48 |
| **8500** | 1121 | 5972 | 6.87 | 1160 | 6290 | 7.23 | 1198 | 6604 | 7.60 | 1234 | 6914 | 7.95 | 1269 | 7223 | 8.31 |

LEGEND

**Bhp** — Brake Horsepower Input to Fan
**FIOP** — Factory-Installed Option
**Watts** — Input Watts to Motor

*For standard motor with standard drive, the drive range is 485 to 613 rpm (208/230 and 460-v units) or 472 to 619 (575-v units). For standard motor with alternate drive, the drive range is 618 to 789 rpm (208/230 and 460-v units) or 609 to 778 (575-v units). For alternate motor with standard drive, the drive range is 778 to 1021 rpm. For alternate motor with optional drive, the drive range is 1000 to 1227 rpm. All other rpms require a field-supplied drive.

NOTES:
1. Maximum continuous Bhp for the standard motor is 4.25 (for 208/230 and 460-v units) or 3.45 (for 575-v units). Maximum continuous Bhp for the alternate motor is 5.75. The maximum continuous watts for the standard motor is 3171 (for 208/230 and 460-v units) or 2574 (for 575-v units). The maximum continuous watts for the alternate motor is 4290. Do not adjust motor rpm such that motor maximum Bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses must be added to external static pressure before entering fan performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on economizer, filters, unit casing, and wet coil losses.
5. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Table 25 on page 37 for additional information.
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.

## Table 4 — Fan Performance — 48HGF014 (High Heat Units) — Vertical Discharge Units*

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.2 | | | 0.4 | | | 0.6 | | | 0.8 | | | 1.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **3500** | 470 | 611 | 0.70 | 556 | 791 | 0.91 | 630 | 967 | 1.11 | 697 | 1141 | 1.31 | 760 | 1314 | 1.51 |
| **4000** | 511 | 802 | 0.92 | 591 | 1001 | 1.15 | 661 | 1194 | 1.37 | 725 | 1383 | 1.59 | 784 | 1572 | 1.81 |
| **4500** | 553 | 1029 | 1.18 | 629 | 1248 | 1.44 | 695 | 1458 | 1.68 | 756 | 1663 | 1.91 | 812 | 1866 | 2.15 |
| **5000** | 597 | 1297 | 1.49 | 669 | 1534 | 1.76 | 732 | 1761 | 2.03 | 789 | 1982 | 2.28 | 843 | 2201 | 2.53 |
| **5500** | 641 | 1606 | 1.85 | 709 | 1862 | 2.14 | 770 | 2106 | 2.42 | 825 | 2343 | 2.70 | 876 | 2577 | 2.96 |
| **6000** | 686 | 1961 | 2.26 | 751 | 2234 | 2.57 | 809 | 2495 | 2.87 | 862 | 2749 | 3.16 | 911 | 2997 | 3.45 |
| **6500** | 732 | 2363 | 2.72 | 794 | 2653 | 3.05 | 849 | 2931 | 3.37 | 900 | 3201 | 3.68 | 948 | 3465 | 3.99 |
| **7000** | 779 | 2815 | 3.24 | 837 | 3122 | 3.59 | 891 | 3416 | 3.93 | 940 | 3702 | 4.26 | 986 | 3981 | 4.58 |
| **7500** | 826 | 3320 | 3.82 | 882 | 3642 | 4.19 | 933 | 3953 | 4.55 | 980 | 4254 | 4.89 | 1025 | 4549 | 5.23 |
| **8000** | 873 | 3879 | 4.46 | 926 | 4217 | 4.85 | 975 | 4542 | 5.22 | 1021 | 4860 | 5.59 | 1065 | 5169 | 5.95 |
| **8500** | 921 | 4495 | 5.17 | 972 | 4847 | 5.57 | 1019 | 5189 | 5.97 | 1063 | 5521 | 6.35 | 1105 | 5846 | 6.72 |

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.2 | | | 1.4 | | | 1.6 | | | 1.8 | | | 2.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **3500** | 818 | 1488 | 1.71 | 874 | 1661 | 1.91 | 927 | 1835 | 2.11 | 978 | 2008 | 2.31 | 1026 | 2182 | 2.51 |
| **4000** | 840 | 1760 | 2.02 | 893 | 1948 | 2.24 | 943 | 2136 | 2.46 | 992 | 2324 | 2.67 | 1039 | 2512 | 2.89 |
| **4500** | 865 | 2068 | 2.38 | 915 | 2270 | 2.61 | 964 | 2472 | 2.84 | 1011 | 2673 | 3.07 | 1056 | 2876 | 3.31 |
| **5000** | 893 | 2417 | 2.78 | 942 | 2632 | 3.03 | 988 | 2848 | 3.28 | 1033 | 3063 | 3.52 | 1076 | 3278 | 3.77 |
| **5500** | 925 | 2808 | 3.23 | 971 | 3037 | 3.49 | 1016 | 3266 | 3.76 | 1059 | 3494 | 4.02 | 1100 | 3721 | 4.28 |
| **6000** | 958 | 3243 | 3.73 | 1003 | 3486 | 4.01 | 1045 | 3728 | 4.29 | 1087 | 3970 | 4.57 | 1127 | 4210 | 4.84 |
| **6500** | 993 | 3725 | 4.28 | 1036 | 3982 | 4.58 | 1077 | 4238 | 4.87 | 1117 | 4492 | 5.17 | 1156 | 4745 | 5.46 |
| **7000** | 1029 | 4256 | 4.90 | 1071 | 4528 | 5.21 | 1111 | 4797 | 5.52 | 1150 | 5064 | 5.82 | 1187 | 5330 | 6.13 |
| **7500** | 1067 | 4838 | 5.56 | 1107 | 5124 | 5.89 | 1146 | 5407 | 6.22 | 1184 | 5688 | 6.54 | 1220 | 5967 | 6.86 |
| **8000** | 1106 | 5474 | 6.30 | 1145 | 5774 | 6.64 | 1182 | 6071 | 6.98 | 1219 | 6365 | 7.32 | 1254 | 6657 | 7.66 |
| **8500** | 1145 | 6165 | 7.09 | 1183 | 6479 | 7.45 | 1220 | 6790 | 7.81 | 1255 | 7098 | 8.16 | 1290 | 7403 | 8.51 |

LEGEND

**Bhp** — Brake Horsepower Input to Fan
**FIOP** — Factory-Installed Option
**Watts** — Input Watts to Motor

*For standard motor with standard drive, the drive range is 485 to 613 rpm (208/230 and 460-v units) or 472 to 619 (575-v units). For standard motor with alternate drive, the drive range is 618 to 789 rpm (208/230 and 460-v units) or 609 to 778 (575-v units). For alternate motor with standard drive, the drive range is 778 to 1021 rpm. For alternate motor with optional drive, the drive range is 1000 to 1227 rpm. All other rpms require a field-supplied drive.

NOTES:
1. Maximum continuous Bhp for the standard motor is 4.25 (for 208/230 and 460-v units) or 3.45 (for 575-v units). Maximum continuous Bhp for the alternate motor is 5.75. The maximum continuous watts for the standard motor is 3171 (for 208/230 and 460-v units) or 2574 (for 575-v units). The maximum continuous watts for the alternate motor is 4290. Do not adjust motor rpm such that motor maximum Bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses must be added to external static pressure before entering fan performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on economizer, filters, unit casing, and wet coil losses.
5. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Table 25 on page 37 for additional information.
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.

## Table 5 — Fan Performance — 48HGD016 (Low Heat Units) — Vertical Discharge Units*

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.2 | | | 0.4 | | | 0.6 | | | 0.8 | | | 1.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **3500** | 460 | 591 | 0.68 | 548 | 774 | 0.89 | 623 | 951 | 1.09 | 692 | 1126 | 1.29 | 755 | 1301 | 1.50 |
| **4000** | 499 | 774 | 0.89 | 581 | 976 | 1.12 | 653 | 1170 | 1.35 | 717 | 1361 | 1.56 | 777 | 1551 | 1.78 |
| **4500** | 538 | 990 | 1.14 | 617 | 1212 | 1.39 | 685 | 1423 | 1.64 | 746 | 1630 | 1.88 | 803 | 1835 | 2.11 |
| **5000** | 579 | 1243 | 1.43 | 654 | 1485 | 1.71 | 719 | 1715 | 1.97 | 778 | 1938 | 2.23 | 832 | 2158 | 2.48 |
| **5500** | 621 | 1536 | 1.77 | 693 | 1798 | 2.07 | 755 | 2045 | 2.35 | 811 | 2285 | 2.63 | 864 | 2520 | 2.90 |
| **6000** | 664 | 1871 | 2.15 | 732 | 2152 | 2.48 | 792 | 2417 | 2.78 | 846 | 2673 | 3.07 | 897 | 2925 | 3.36 |
| **6500** | 707 | 2250 | 2.59 | 772 | 2550 | 2.93 | 830 | 2834 | 3.26 | 883 | 3106 | 3.57 | 932 | 3373 | 3.88 |
| **7000** | 751 | 2676 | 3.08 | 813 | 2994 | 3.44 | 869 | 3295 | 3.79 | 920 | 3585 | 4.12 | 967 | 3868 | 4.45 |
| **7500** | 795 | 3150 | 3.62 | 855 | 3487 | 4.01 | 909 | 3805 | 4.38 | 958 | 4112 | 4.73 | 1004 | 4411 | 5.07 |
| **8000** | 839 | 3676 | 4.23 | 897 | 4029 | 4.63 | 949 | 4366 | 5.02 | 997 | 4689 | 5.39 | 1042 | 5004 | 5.75 |
| **8500** | 884 | 4253 | 4.89 | 940 | 4625 | 5.32 | 990 | 4978 | 5.73 | 1037 | 5318 | 6.12 | 1080 | 5649 | 6.50 |

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.2 | | | 1.4 | | | 1.6 | | | 1.8 | | | 2.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **3500** | 814 | 1476 | 1.70 | 871 | 1650 | 1.90 | 924 | 1825 | 2.10 | 975 | 1999 | 2.30 | 1023 | 2173 | 2.50 |
| **4000** | 834 | 1740 | 2.00 | 888 | 1930 | 2.22 | 939 | 2119 | 2.44 | 988 | 2308 | 2.65 | 1035 | 2497 | 2.87 |
| **4500** | 857 | 2039 | 2.35 | 909 | 2243 | 2.58 | 958 | 2446 | 2.81 | 1005 | 2650 | 3.05 | 1051 | 2853 | 3.28 |
| **5000** | 884 | 2376 | 2.73 | 933 | 2594 | 2.98 | 980 | 2811 | 3.23 | 1026 | 3028 | 3.48 | 1070 | 3244 | 3.73 |
| **5500** | 913 | 2753 | 3.17 | 960 | 2984 | 3.43 | 1006 | 3215 | 3.70 | 1049 | 3445 | 3.96 | 1092 | 3674 | 4.23 |
| **6000** | 945 | 3172 | 3.65 | 990 | 3417 | 3.93 | 1034 | 3662 | 4.21 | 1076 | 3905 | 4.49 | 1117 | 4147 | 4.77 |
| **6500** | 978 | 3636 | 4.18 | 1022 | 3895 | 4.48 | 1064 | 4153 | 4.78 | 1104 | 4409 | 5.07 | 1144 | 4665 | 5.37 |
| **7000** | 1012 | 4145 | 4.77 | 1055 | 4419 | 5.08 | 1095 | 4691 | 5.39 | 1135 | 4960 | 5.70 | 1173 | 5229 | 6.01 |
| **7500** | 1047 | 4703 | 5.41 | 1089 | 4992 | 5.74 | 1128 | 5277 | 6.07 | 1167 | 5561 | 6.40 | 1204 | 5842 | 6.72 |
| **8000** | 1084 | 5311 | 6.11 | 1124 | 5615 | 6.46 | 1163 | 5915 | 6.80 | 1200 | 6211 | 7.14 | 1236 | 6506 | 7.48 |
| **8500** | 1121 | 5972 | 6.87 | 1160 | 6290 | 7.23 | 1198 | 6604 | 7.60 | 1234 | 6914 | 7.95 | 1269 | 7223 | 8.31 |

LEGEND

**Bhp** — Brake Horsepower Input to Fan
**FIOP** — Factory-Installed Option
**Watts** — Input Watts to Motor

*For standard motor with standard drive, the drive range is 618 to 789 rpm (208/230 and 460-v units) or 609 to 778 (575-v units). For standard motor with alternate drive, the drive range is 485 to 613 rpm (208/230 and 460-v units) or 472 to 619 (575-v units). For alternate motor with standard drive, the drive range is 778 to 1021 rpm. For alternate motor with optional drive, the drive range is 1000 to 1227 rpm. All other rpms require a field-supplied drive.

NOTES:
1. Maximum continuous Bhp for the standard motor is 4.25 (for 208/230 and 460-v units) or 3.45 (for 575-v units). Maximum continuous Bhp for the alternate motor is 5.75. The maximum continuous watts for the standard motor is 3171 (for 208/230 and 460-v units) or 2574 (for 575-v units). The maximum continuous watts for the alternate motor is 4290. Do not adjust motor rpm such that motor maximum Bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses must be added to external static pressure before entering fan performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on economizer, filters, unit casing, and wet coil losses.
5. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Table 25 on page 37 for additional information.
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.

## Table 6 — Fan Performance — 48HGF016 (High Heat Units) — Vertical Discharge Units*

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.2 | | | 0.4 | | | 0.6 | | | 0.8 | | | 1.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **3500** | 470 | 611 | 0.70 | 556 | 791 | 0.91 | 630 | 967 | 1.11 | 697 | 1141 | 1.31 | 760 | 1314 | 1.51 |
| **4000** | 511 | 802 | 0.92 | 591 | 1001 | 1.15 | 661 | 1194 | 1.37 | 725 | 1383 | 1.59 | 784 | 1572 | 1.81 |
| **4500** | 553 | 1029 | 1.18 | 629 | 1248 | 1.44 | 695 | 1458 | 1.68 | 756 | 1663 | 1.91 | 812 | 1866 | 2.15 |
| **5000** | 597 | 1297 | 1.49 | 669 | 1534 | 1.76 | 732 | 1761 | 2.03 | 789 | 1982 | 2.28 | 843 | 2201 | 2.53 |
| **5500** | 641 | 1606 | 1.85 | 709 | 1862 | 2.14 | 770 | 2106 | 2.42 | 825 | 2343 | 2.70 | 876 | 2577 | 2.96 |
| **6000** | 686 | 1961 | 2.26 | 751 | 2234 | 2.57 | 809 | 2495 | 2.87 | 862 | 2749 | 3.16 | 911 | 2997 | 3.45 |
| **6500** | 732 | 2363 | 2.72 | 794 | 2653 | 3.05 | 849 | 2931 | 3.37 | 900 | 3201 | 3.68 | 948 | 3465 | 3.99 |
| **7000** | 779 | 2815 | 3.24 | 837 | 3122 | 3.59 | 891 | 3416 | 3.93 | 940 | 3702 | 4.26 | 986 | 3981 | 4.58 |
| **7500** | 826 | 3320 | 3.82 | 882 | 3642 | 4.19 | 933 | 3953 | 4.55 | 980 | 4254 | 4.89 | 1025 | 4549 | 5.23 |
| **8000** | 873 | 3879 | 4.46 | 926 | 4217 | 4.85 | 975 | 4542 | 5.22 | 1021 | 4860 | 5.59 | 1065 | 5169 | 5.95 |
| **8500** | 921 | 4495 | 5.17 | 972 | 4847 | 5.57 | 1019 | 5189 | 5.97 | 1063 | 5521 | 6.35 | 1105 | 5846 | 6.72 |

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.2 | | | 1.4 | | | 1.6 | | | 1.8 | | | 2.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **3500** | 818 | 1488 | 1.71 | 874 | 1661 | 1.91 | 927 | 1835 | 2.11 | 978 | 2008 | 2.31 | 1026 | 2182 | 2.51 |
| **4000** | 840 | 1760 | 2.02 | 893 | 1948 | 2.24 | 943 | 2136 | 2.46 | 992 | 2324 | 2.67 | 1039 | 2512 | 2.89 |
| **4500** | 865 | 2068 | 2.38 | 915 | 2270 | 2.61 | 964 | 2472 | 2.84 | 1011 | 2673 | 3.07 | 1056 | 2876 | 3.31 |
| **5000** | 893 | 2417 | 2.78 | 942 | 2632 | 3.03 | 988 | 2848 | 3.28 | 1033 | 3063 | 3.52 | 1076 | 3278 | 3.77 |
| **5500** | 925 | 2808 | 3.23 | 971 | 3037 | 3.49 | 1016 | 3266 | 3.76 | 1059 | 3494 | 4.02 | 1100 | 3721 | 4.28 |
| **6000** | 958 | 3243 | 3.73 | 1003 | 3486 | 4.01 | 1045 | 3728 | 4.29 | 1087 | 3970 | 4.57 | 1127 | 4210 | 4.84 |
| **6500** | 993 | 3725 | 4.28 | 1036 | 3982 | 4.58 | 1077 | 4238 | 4.87 | 1117 | 4492 | 5.17 | 1156 | 4745 | 5.46 |
| **7000** | 1029 | 4256 | 4.90 | 1071 | 4528 | 5.21 | 1111 | 4797 | 5.52 | 1150 | 5064 | 5.82 | 1187 | 5330 | 6.13 |
| **7500** | 1067 | 4838 | 5.56 | 1107 | 5124 | 5.89 | 1146 | 5407 | 6.22 | 1184 | 5688 | 6.54 | 1220 | 5967 | 6.86 |
| **8000** | 1106 | 5474 | 6.30 | 1145 | 5774 | 6.64 | 1182 | 6071 | 6.98 | 1219 | 6365 | 7.32 | 1254 | 6657 | 7.66 |
| **8500** | 1145 | 6165 | 7.09 | 1183 | 6479 | 7.45 | 1220 | 6790 | 7.81 | 1255 | 7098 | 8.16 | 1290 | 7403 | 8.51 |

LEGEND

**Bhp** — Brake Horsepower Input to Fan
**FIOP** — Factory-Installed Option
**Watts** — Input Watts to Motor

*For standard motor with standard drive, the drive range is 618 to 789 rpm (208/230 and 460-v units) or 609 to 778 (575-v units). For standard motor with alternate drive, the drive range is 485 to 613 rpm (208/230 and 460-v units) or 472 to 619 (575-v units). For alternate motor with standard drive, the drive range is 778 to 1021 rpm. For alternate motor with optional drive, the drive range is 1000 to 1227 rpm. All other rpms require a field-supplied drive.

NOTES:
1. Maximum continuous Bhp for the standard motor is 4.25 (for 208/230 and 460-v units) or 3.45 (for 575-v units). Maximum continuous Bhp for the alternate motor is 5.75. The maximum continuous watts for the standard motor is 3171 (for 208/230 and 460-v units) or 2574 (for 575-v units). The maximum continuous watts for the alternate motor is 4290. Do not adjust motor rpm such that motor maximum Bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses must be added to external static pressure before entering fan performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on economizer, filters, unit casing, and wet coil losses.
5. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Table 25 on page 37 for additional information.
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.

## Table 7 — Fan Performance — 48HGD020 (Low Heat Units) — Vertical Discharge Units*

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.2 | | | 0.4 | | | 0.6 | | | 0.8 | | | 1.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **3500** | 460 | 591 | 0.68 | 548 | 774 | 0.89 | 623 | 951 | 1.09 | 692 | 1126 | 1.29 | 755 | 1301 | 1.50 |
| **4000** | 499 | 774 | 0.89 | 581 | 976 | 1.12 | 653 | 1170 | 1.35 | 717 | 1361 | 1.56 | 777 | 1551 | 1.78 |
| **4500** | 538 | 990 | 1.14 | 617 | 1212 | 1.39 | 685 | 1423 | 1.64 | 746 | 1630 | 1.88 | 803 | 1835 | 2.11 |
| **5000** | 579 | 1243 | 1.43 | 654 | 1485 | 1.71 | 719 | 1715 | 1.97 | 778 | 1938 | 2.23 | 832 | 2158 | 2.48 |
| **5500** | 621 | 1536 | 1.77 | 693 | 1798 | 2.07 | 755 | 2045 | 2.35 | 811 | 2285 | 2.63 | 864 | 2520 | 2.90 |
| **6000** | 664 | 1871 | 2.15 | 732 | 2152 | 2.48 | 792 | 2417 | 2.78 | 846 | 2673 | 3.07 | 897 | 2925 | 3.36 |
| **6500** | 707 | 2250 | 2.59 | 772 | 2550 | 2.93 | 830 | 2834 | 3.26 | 883 | 3106 | 3.57 | 932 | 3373 | 3.88 |
| **7000** | 751 | 2676 | 3.08 | 813 | 2994 | 3.44 | 869 | 3295 | 3.79 | 920 | 3585 | 4.12 | 967 | 3868 | 4.45 |
| **7500** | 795 | 3150 | 3.62 | 855 | 3487 | 4.01 | 909 | 3805 | 4.38 | 958 | 4112 | 4.73 | 1004 | 4411 | 5.07 |
| **8000** | 839 | 3676 | 4.23 | 897 | 4029 | 4.63 | 949 | 4366 | 5.02 | 997 | 4689 | 5.39 | 1042 | 5004 | 5.75 |
| **8500** | 884 | 4253 | 4.89 | 940 | 4625 | 5.32 | 990 | 4978 | 5.73 | 1037 | 5318 | 6.12 | 1080 | 5649 | 6.50 |

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.2 | | | 1.4 | | | 1.6 | | | 1.8 | | | 2.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **3500** | 814 | 1476 | 1.70 | 871 | 1650 | 1.90 | 924 | 1825 | 2.10 | 975 | 1999 | 2.30 | 1023 | 2173 | 2.50 |
| **4000** | 834 | 1740 | 2.00 | 888 | 1930 | 2.22 | 939 | 2119 | 2.44 | 988 | 2308 | 2.65 | 1035 | 2497 | 2.87 |
| **4500** | 857 | 2039 | 2.35 | 909 | 2243 | 2.58 | 958 | 2446 | 2.81 | 1005 | 2650 | 3.05 | 1051 | 2853 | 3.28 |
| **5000** | 884 | 2376 | 2.73 | 933 | 2594 | 2.98 | 980 | 2811 | 3.23 | 1026 | 3028 | 3.48 | 1070 | 3244 | 3.73 |
| **5500** | 913 | 2753 | 3.17 | 960 | 2984 | 3.43 | 1006 | 3215 | 3.70 | 1049 | 3445 | 3.96 | 1092 | 3674 | 4.23 |
| **6000** | 945 | 3172 | 3.65 | 990 | 3417 | 3.93 | 1034 | 3662 | 4.21 | 1076 | 3905 | 4.49 | 1117 | 4147 | 4.77 |
| **6500** | 978 | 3636 | 4.18 | 1022 | 3895 | 4.48 | 1064 | 4153 | 4.78 | 1104 | 4409 | 5.07 | 1144 | 4665 | 5.37 |
| **7000** | 1012 | 4145 | 4.77 | 1055 | 4419 | 5.08 | 1095 | 4691 | 5.39 | 1135 | 4960 | 5.70 | 1173 | 5229 | 6.01 |
| **7500** | 1047 | 4703 | 5.41 | 1089 | 4992 | 5.74 | 1128 | 5277 | 6.07 | 1167 | 5561 | 6.40 | 1204 | 5842 | 6.72 |
| **8000** | 1084 | 5311 | 6.11 | 1124 | 5615 | 6.46 | 1163 | 5915 | 6.80 | 1200 | 6211 | 7.14 | 1236 | 6506 | 7.48 |
| **8500** | 1121 | 5972 | 6.87 | 1160 | 6290 | 7.23 | 1198 | 6604 | 7.60 | 1234 | 6914 | 7.95 | 1269 | 7223 | 8.31 |

LEGEND

**Bhp** — Brake Horsepower Input to Fan
**FIOP** — Factory-Installed Option
**Watts** — Input Watts to Motor

*For standard motor with standard drive, the drive range is 658 to 808 rpm. For standard motor with alternate drive, the drive range is 794 to 974 rpm. For alternate motor with standard drive, the drive range is 949 to 1145 rpm. For alternate motor with optional drive, the drive range is 1126 to 1328 rpm. All other rpms require a field-supplied drive.

NOTES:
1. Maximum continuous Bhp for the standard motor is 5.75. Maximum continuous Bhp for the alternate motor is 8.63. The maximum continuous watts for the standard motor is 4290. The maximum continuous watts for the alternate motor is 6438. Do not adjust motor rpm such that motor maximum Bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses must be added to external static pressure before entering fan performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on economizer, filters, unit casing, and wet coil losses.
5. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Table 25 on page 37 for additional information.
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.

## Table 8 — Fan Performance — 48HGF020 (High Heat Units) — Vertical Discharge Units*

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.2 | | | 0.4 | | | 0.6 | | | 0.8 | | | 1.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **3500** | 470 | 611 | 0.70 | 556 | 791 | 0.91 | 630 | 967 | 1.11 | 697 | 1141 | 1.31 | 760 | 1314 | 1.51 |
| **4000** | 511 | 802 | 0.92 | 591 | 1001 | 1.15 | 661 | 1194 | 1.37 | 725 | 1383 | 1.59 | 784 | 1572 | 1.81 |
| **4500** | 553 | 1029 | 1.18 | 629 | 1248 | 1.44 | 695 | 1458 | 1.68 | 756 | 1663 | 1.91 | 812 | 1866 | 2.15 |
| **5000** | 597 | 1297 | 1.49 | 669 | 1534 | 1.76 | 732 | 1761 | 2.03 | 789 | 1982 | 2.28 | 843 | 2201 | 2.53 |
| **5500** | 641 | 1606 | 1.85 | 709 | 1862 | 2.14 | 770 | 2106 | 2.42 | 825 | 2343 | 2.70 | 876 | 2577 | 2.96 |
| **6000** | 686 | 1961 | 2.26 | 751 | 2234 | 2.57 | 809 | 2495 | 2.87 | 862 | 2749 | 3.16 | 911 | 2997 | 3.45 |
| **6500** | 732 | 2363 | 2.72 | 794 | 2653 | 3.05 | 849 | 2931 | 3.37 | 900 | 3201 | 3.68 | 948 | 3465 | 3.99 |
| **7000** | 779 | 2815 | 3.24 | 837 | 3122 | 3.59 | 891 | 3416 | 3.93 | 940 | 3702 | 4.26 | 986 | 3981 | 4.58 |
| **7500** | 826 | 3320 | 3.82 | 882 | 3642 | 4.19 | 933 | 3953 | 4.55 | 980 | 4254 | 4.89 | 1025 | 4549 | 5.23 |
| **8000** | 873 | 3879 | 4.46 | 926 | 4217 | 4.85 | 975 | 4542 | 5.22 | 1021 | 4860 | 5.59 | 1065 | 5169 | 5.95 |
| **8500** | 921 | 4495 | 5.17 | 972 | 4847 | 5.57 | 1019 | 5189 | 5.97 | 1063 | 5521 | 6.35 | 1105 | 5846 | 6.72 |

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.2 | | | 1.4 | | | 1.6 | | | 1.8 | | | 2.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **3500** | 818 | 1488 | 1.71 | 874 | 1661 | 1.91 | 927 | 1835 | 2.11 | 978 | 2008 | 2.31 | 1026 | 2182 | 2.51 |
| **4000** | 840 | 1760 | 2.02 | 893 | 1948 | 2.24 | 943 | 2136 | 2.46 | 992 | 2324 | 2.67 | 1039 | 2512 | 2.89 |
| **4500** | 865 | 2068 | 2.38 | 915 | 2270 | 2.61 | 964 | 2472 | 2.84 | 1011 | 2673 | 3.07 | 1056 | 2876 | 3.31 |
| **5000** | 893 | 2417 | 2.78 | 942 | 2632 | 3.03 | 988 | 2848 | 3.28 | 1033 | 3063 | 3.52 | 1076 | 3278 | 3.77 |
| **5500** | 925 | 2808 | 3.23 | 971 | 3037 | 3.49 | 1016 | 3266 | 3.76 | 1059 | 3494 | 4.02 | 1100 | 3721 | 4.28 |
| **6000** | 958 | 3243 | 3.73 | 1003 | 3486 | 4.01 | 1045 | 3728 | 4.29 | 1087 | 3970 | 4.57 | 1127 | 4210 | 4.84 |
| **6500** | 993 | 3725 | 4.28 | 1036 | 3982 | 4.58 | 1077 | 4238 | 4.87 | 1117 | 4492 | 5.17 | 1156 | 4745 | 5.46 |
| **7000** | 1029 | 4256 | 4.90 | 1071 | 4528 | 5.21 | 1111 | 4797 | 5.52 | 1150 | 5064 | 5.82 | 1187 | 5330 | 6.13 |
| **7500** | 1067 | 4838 | 5.56 | 1107 | 5124 | 5.89 | 1146 | 5407 | 6.22 | 1184 | 5688 | 6.54 | 1220 | 5967 | 6.86 |
| **8000** | 1106 | 5474 | 6.30 | 1145 | 5774 | 6.64 | 1182 | 6071 | 6.98 | 1219 | 6365 | 7.32 | 1254 | 6657 | 7.66 |
| **8500** | 1145 | 6165 | 7.09 | 1183 | 6479 | 7.45 | 1220 | 6790 | 7.81 | 1255 | 7098 | 8.16 | 1290 | 7403 | 8.51 |

LEGEND

**Bhp** — Brake Horsepower Input to Fan
**FIOP** — Factory-Installed Option
**Watts** — Input Watts to Motor

*For standard motor with standard drive, the drive range is 658 to 808 rpm. For standard motor with alternate drive, the drive range is 794 to 974 rpm. For alternate motor with standard drive, the drive range is 949 to 1145 rpm. For alternate motor with optional drive, the drive range is 1126 to 1328 rpm. All other rpms require a field-supplied drive.

NOTES:
1. Maximum continuous Bhp for the standard motor is 5.75. Maximum continuous Bhp for the alternate motor is 8.63. The maximum continuous watts for the standard motor is 4290. The maximum continuous watts for the alternate motor is 6438. Do not adjust motor rpm such that motor maximum Bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses must be added to external static pressure before entering fan performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on economizer, filters, unit casing, and wet coil losses.
5. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Table 25 on page 37 for additional information.
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.

## Table 9 — Fan Performance — 48HGD024 (Low Heat Units) — Vertical Discharge Units*

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.2 | | | 0.4 | | | 0.6 | | | 0.8 | | | 1.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **5,000** | 590 | 1276 | 1.47 | 663 | 1516 | 1.74 | 727 | 1745 | 2.01 | 786 | 1968 | 2.26 | 840 | 2189 | 2.52 |
| **5,500** | 633 | 1579 | 1.82 | 703 | 1838 | 2.11 | 764 | 2084 | 2.40 | 820 | 2324 | 2.67 | 872 | 2560 | 2.94 |
| **6,000** | 677 | 1925 | 2.21 | 744 | 2203 | 2.53 | 803 | 2467 | 2.84 | 857 | 2723 | 3.13 | 907 | 2974 | 3.42 |
| **6,500** | 722 | 2317 | 2.67 | 786 | 2614 | 3.01 | 842 | 2896 | 3.33 | 894 | 3167 | 3.64 | 942 | 3434 | 3.95 |
| **7,000** | 767 | 2758 | 3.17 | 828 | 3073 | 3.53 | 883 | 3371 | 3.88 | 933 | 3660 | 4.21 | 979 | 3942 | 4.53 |
| **7,500** | 813 | 3250 | 3.74 | 871 | 3582 | 4.12 | 924 | 3897 | 4.48 | 972 | 4202 | 4.83 | 1017 | 4500 | 5.18 |
| **8,000** | 859 | 3795 | 4.36 | 915 | 4143 | 4.77 | 966 | 4475 | 5.15 | 1012 | 4797 | 5.52 | 1056 | 5110 | 5.88 |
| **8,500** | 906 | 4394 | 5.05 | 959 | 4759 | 5.47 | 1008 | 5107 | 5.87 | 1053 | 5445 | 6.26 | 1096 | 5774 | 6.64 |
| **9,000** | 952 | 5051 | 5.81 | 1004 | 5432 | 6.25 | 1051 | 5797 | 6.67 | 1095 | 6150 | 7.07 | 1136 | 6494 | 7.47 |
| **9,500** | 999 | 5767 | 6.63 | 1049 | 6163 | 7.09 | 1094 | 6544 | 7.53 | 1137 | 6913 | 7.95 | 1177 | 7272 | 8.36 |
| **10,000** | 1047 | 6544 | 7.53 | 1094 | 6956 | 8.00 | 1138 | 7352 | 8.46 | 1180 | 7736 | 8.90 | 1219 | 8111 | 9.33 |

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.2 | | | 1.4 | | | 1.6 | | | 1.8 | | | 2.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **5,000** | 891 | 2408 | 2.77 | 940 | 2625 | 3.02 | 987 | 2843 | 3.27 | 1032 | 3060 | 3.52 | 1076 | 3277 | 3.77 |
| **5,500** | 921 | 2792 | 3.21 | 968 | 3024 | 3.48 | 1014 | 3255 | 3.74 | 1057 | 3485 | 4.01 | 1099 | 3716 | 4.27 |
| **6,000** | 954 | 3221 | 3.70 | 999 | 3467 | 3.99 | 1042 | 3711 | 4.27 | 1084 | 3955 | 4.55 | 1125 | 4198 | 4.83 |
| **6,500** | 988 | 3696 | 4.25 | 1032 | 3956 | 4.55 | 1073 | 4214 | 4.85 | 1114 | 4470 | 5.14 | 1153 | 4726 | 5.44 |
| **7,000** | 1024 | 4219 | 4.85 | 1066 | 4493 | 5.17 | 1106 | 4764 | 5.48 | 1145 | 5034 | 5.79 | 1183 | 5303 | 6.10 |
| **7,500** | 1060 | 4792 | 5.51 | 1101 | 5080 | 5.84 | 1140 | 5365 | 6.17 | 1178 | 5649 | 6.50 | 1215 | 5930 | 6.82 |
| **8,000** | 1098 | 5417 | 6.23 | 1138 | 5719 | 6.58 | 1176 | 6018 | 6.92 | 1213 | 6315 | 7.26 | 1249 | 6610 | 7.60 |
| **8,500** | 1137 | 6096 | 7.01 | 1175 | 6413 | 7.38 | 1212 | 6726 | 7.74 | 1248 | 7036 | 8.09 | 1283 | 7344 | 8.45 |
| **9,000** | 1176 | 6831 | 7.86 | 1214 | 7163 | 8.24 | 1250 | 7490 | 8.61 | 1285 | 7814 | 8.99 | 1319 | 8135 | 9.36 |
| **9,500** | 1216 | 7624 | 8.77 | 1253 | 7970 | 9.17 | 1288 | 8312 | 9.56 | 1322 | 8649 | 9.95 | 1355 | 8984 | 10.33 |
| **10,000** | 1256 | 8478 | 9.75 | 1292 | 8838 | 10.16 | 1327 | 9193 | 10.57 | 1360 | 9545 | 10.98 | 1393 | 9893 | 11.38 |

LEGEND

**Bhp** — Brake Horsepower Input to Fan
**FIOP** — Factory-Installed Option
**Watts** — Input Watts to Motor

*For standard motor with standard drive, the drive range is 658 to 808 rpm. For standard motor with alternate drive, the drive range is 794 to 974 rpm. For alternate motor with standard drive, the drive range is 949 to 1145 rpm. For alternate motor with optional drive, the drive range is 1126 to 1328 rpm. All other rpms require a field-supplied drive.

NOTES:
1. Maximum continuous Bhp for the standard motor is 5.75. Maximum continuous Bhp for the alternate motor is 8.63. The maximum continuous watts for the standard motor is 4290. The maximum continuous watts for the alternate motor is 6438. Do not adjust motor rpm such that motor maximum Bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses must be added to external static pressure before entering fan performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on economizer, filters, unit casing, and wet coil losses.
5. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Table 25 on page 37 for additional information.
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.

## Table 10 — Fan Performance — 48HGF024 (High Heat Units) — Vertical Discharge Units*

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.2 | | | 0.4 | | | 0.6 | | | 0.8 | | | 1.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **5,000** | 607 | 1329 | 1.53 | 677 | 1565 | 1.80 | 740 | 1791 | 2.06 | 797 | 2013 | 2.31 | 850 | 2231 | 2.57 |
| **5,500** | 652 | 1648 | 1.90 | 719 | 1902 | 2.19 | 779 | 2145 | 2.47 | 833 | 2382 | 2.74 | 884 | 2616 | 3.01 |
| **6,000** | 699 | 2013 | 2.32 | 763 | 2285 | 2.63 | 819 | 2545 | 2.93 | 872 | 2798 | 3.22 | 921 | 3046 | 3.50 |
| **6,500** | 746 | 2428 | 2.79 | 807 | 2716 | 3.12 | 861 | 2993 | 3.44 | 911 | 3262 | 3.75 | 958 | 3525 | 4.05 |
| **7,000** | 794 | 2895 | 3.33 | 851 | 3198 | 3.68 | 904 | 3491 | 4.02 | 952 | 3776 | 4.34 | 998 | 4055 | 4.66 |
| **7,500** | 842 | 3415 | 3.93 | 897 | 3735 | 4.30 | 947 | 4043 | 4.65 | 994 | 4343 | 5.00 | 1038 | 4637 | 5.33 |
| **8,000** | 891 | 3992 | 4.59 | 943 | 4327 | 4.98 | 991 | 4650 | 5.35 | 1036 | 4966 | 5.71 | 1079 | 5274 | 6.07 |
| **8,500** | 940 | 4628 | 5.32 | 990 | 4977 | 5.72 | 1036 | 5316 | 6.11 | 1080 | 5646 | 6.49 | 1121 | 5970 | 6.87 |
| **9,000** | 990 | 5325 | 6.12 | 1037 | 5688 | 6.54 | 1082 | 6042 | 6.95 | 1124 | 6386 | 7.35 | 1163 | 6724 | 7.73 |
| **9,500** | 1039 | 6085 | 7.00 | 1085 | 6462 | 7.43 | 1128 | 6829 | 7.85 | 1168 | 7188 | 8.27 | 1207 | 7541 | 8.67 |
| **10,000** | 1089 | 6911 | 7.95 | 1133 | 7301 | 8.40 | 1174 | 7682 | 8.83 | 1213 | 8055 | 9.26 | 1251 | 8421 | 9.69 |

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.2 | | | 1.4 | | | 1.6 | | | 1.8 | | | 2.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **5,000** | 900 | 2448 | 2.82 | 949 | 2664 | 3.06 | 995 | 2879 | 3.31 | 1040 | 3095 | 3.56 | 1083 | 3310 | 3.81 |
| **5,500** | 933 | 2847 | 3.27 | 979 | 3077 | 3.54 | 1023 | 3305 | 3.80 | 1066 | 3534 | 4.06 | 1108 | 3762 | 4.33 |
| **6,000** | 967 | 3292 | 3.79 | 1011 | 3535 | 4.07 | 1054 | 3778 | 4.35 | 1095 | 4019 | 4.62 | 1135 | 4260 | 4.90 |
| **6,500** | 1003 | 3785 | 4.35 | 1046 | 4043 | 4.65 | 1087 | 4298 | 4.94 | 1127 | 4553 | 5.24 | 1165 | 4806 | 5.53 |
| **7,000** | 1041 | 4330 | 4.98 | 1082 | 4601 | 5.29 | 1122 | 4870 | 5.60 | 1160 | 5138 | 5.91 | 1197 | 5404 | 6.22 |
| **7,500** | 1079 | 4926 | 5.67 | 1119 | 5212 | 5.99 | 1158 | 5495 | 6.32 | 1195 | 5776 | 6.64 | 1231 | 6055 | 6.96 |
| **8,000** | 1119 | 5578 | 6.42 | 1158 | 5878 | 6.76 | 1195 | 6174 | 7.10 | 1231 | 6468 | 7.44 | 1267 | 6761 | 7.78 |
| **8,500** | 1160 | 6288 | 7.23 | 1198 | 6601 | 7.59 | 1234 | 6912 | 7.95 | 1269 | 7219 | 8.30 | 1303 | 7524 | 8.65 |
| **9,000** | 1202 | 7056 | 8.12 | 1238 | 7384 | 8.49 | 1273 | 7708 | 8.87 | 1308 | 8029 | 9.23 | 1341 | 8347 | 9.60 |
| **9,500** | 1244 | 7887 | 9.07 | 1279 | 8228 | 9.46 | 1314 | 8566 | 9.85 | 1347 | 8900 | 10.24 | 1379 | 9231 | 10.62 |
| **10,000** | 1287 | 8781 | 10.10 | 1321 | 9137 | 10.51 | 1355 | 9488 | 10.91 | 1387 | 9836 | 11.31 | — | — | — |

LEGEND

**Bhp** — Brake Horsepower Input to Fan
**FIOP** — Factory-Installed Option
**Watts** — Input Watts to Motor

*For standard motor with standard drive, the drive range is 658 to 808 rpm. For standard motor with alternate drive, the drive range is 794 to 974 rpm. For alternate motor with standard drive, the drive range is 949 to 1145 rpm. For alternate motor with optional drive, the drive range is 1126 to 1328 rpm. All other rpms require a field-supplied drive.

NOTES:
1. Maximum continuous Bhp for the standard motor is 5.75. Maximum continuous Bhp for the alternate motor is 8.63. The maximum continuous watts for the standard motor is 4290. The maximum continuous watts for the alternate motor is 6438. Do not adjust motor rpm such that motor maximum Bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses must be added to external static pressure before entering fan performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on economizer, filters, unit casing, and wet coil losses.
5. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Table 25 on page 37 for additional information.
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.

## Table 11 — Fan Performance — 48HGD028 (Low Heat Units) — Vertical Discharge Units*

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.2 | | | 0.4 | | | 0.6 | | | 0.8 | | | 1.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **7,500** | 813 | 3250 | 3.74 | 871 | 3582 | 4.12 | 924 | 3897 | 4.48 | 972 | 4202 | 4.83 | 1017 | 4500 | 5.18 |
| **8,000** | 859 | 3795 | 4.36 | 915 | 4143 | 4.77 | 966 | 4475 | 5.15 | 1012 | 4797 | 5.52 | 1056 | 5110 | 5.88 |
| **8,500** | 906 | 4394 | 5.05 | 959 | 4759 | 5.47 | 1008 | 5107 | 5.87 | 1053 | 5445 | 6.26 | 1096 | 5774 | 6.64 |
| **9,000** | 952 | 5051 | 5.81 | 1004 | 5432 | 6.25 | 1051 | 5797 | 6.67 | 1095 | 6150 | 7.07 | 1136 | 6494 | 7.47 |
| **9,500** | 999 | 5767 | 6.63 | 1049 | 6163 | 7.09 | 1094 | 6544 | 7.53 | 1137 | 6913 | 7.95 | 1177 | 7272 | 8.36 |
| **10,000** | 1047 | 6544 | 7.53 | 1094 | 6956 | 8.00 | 1138 | 7352 | 8.46 | 1180 | 7736 | 8.90 | 1219 | 8111 | 9.33 |
| **10,500** | 1094 | 7385 | 8.49 | 1140 | 7811 | 8.98 | 1183 | 8222 | 9.46 | 1223 | 8622 | 9.92 | 1261 | 9011 | 10.36 |
| **11,000** | 1142 | 8291 | 9.54 | 1186 | 8732 | 10.04 | 1227 | 9157 | 10.53 | 1266 | 9571 | 11.01 | 1303 | 9976 | 11.47 |
| **11,500** | 1190 | 9264 | 10.65 | 1232 | 9718 | 11.18 | — | — | — | — | — | — | — | — | — |
| **12,000** | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| **12,500** | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.2 | | | 1.4 | | | 1.6 | | | 1.8 | | | 2.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **7,500** | 1060 | 4792 | 5.51 | 1101 | 5080 | 5.84 | 1140 | 5365 | 6.17 | 1178 | 5649 | 6.50 | 1215 | 5930 | 6.82 |
| **8,000** | 1098 | 5417 | 6.23 | 1138 | 5719 | 6.58 | 1176 | 6018 | 6.92 | 1213 | 6315 | 7.26 | 1249 | 6610 | 7.60 |
| **8,500** | 1137 | 6096 | 7.01 | 1175 | 6413 | 7.38 | 1212 | 6726 | 7.74 | 1248 | 7036 | 8.09 | 1283 | 7344 | 8.45 |
| **9,000** | 1176 | 6831 | 7.86 | 1214 | 7163 | 8.24 | 1250 | 7490 | 8.61 | 1285 | 7814 | 8.99 | 1319 | 8135 | 9.36 |
| **9,500** | 1216 | 7624 | 8.77 | 1253 | 7970 | 9.17 | 1288 | 8312 | 9.56 | 1322 | 8649 | 9.95 | 1355 | 8984 | 10.33 |
| **10,000** | 1256 | 8478 | 9.75 | 1292 | 8838 | 10.16 | 1327 | 9193 | 10.57 | 1360 | 9545 | 10.98 | 1393 | 9893 | 11.38 |
| **10,500** | 1298 | 9393 | 10.80 | 1333 | 9768 | 11.23 | — | — | — | — | — | — | — | — | — |
| **11,000** | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| **11,500** | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| **12,000** | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| **12,500** | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

LEGEND

**Bhp** — Brake Horsepower Input to Fan
**FIOP** — Factory-Installed Option
**Watts** — Input Watts to Motor

*For standard motor with standard drive, the drive range is 799 to 965 rpm. For standard motor with alternate drive, the drive range is 717 to 882 rpm. For alternate motor with standard drive, the drive range is 939 to 1152 rpm. For alternate motor with optional drive, the drive range is 1152 to 1366 rpm. All other rpms require a field-supplied drive.

NOTES:
1. Maximum continuous Bhp for the standard motor is 8.63. Maximum continuous Bhp for the alternate motor is 11.50. The maximum continuous watts for the standard motor is 6438. The maximum continuous watts for the alternate motor is 8579. Do not adjust motor rpm such that motor maximum Bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses must be added to external static pressure before entering fan performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on economizer, filters, unit casing, and wet coil losses.
5. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Table 25 on page 37 for additional information.
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.

## Table 12 — Fan Performance — 48HGF028 (High Heat Units) — Vertical Discharge Units*

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.2 | | | 0.4 | | | 0.6 | | | 0.8 | | | 1.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **7,500** | 842 | 3415 | 3.93 | 897 | 3735 | 4.30 | 947 | 4043 | 4.65 | 994 | 4343 | 5.00 | 1038 | 4637 | 5.33 |
| **8,000** | 891 | 3992 | 4.59 | 943 | 4327 | 4.98 | 991 | 4650 | 5.35 | 1036 | 4966 | 5.71 | 1079 | 5274 | 6.07 |
| **8,500** | 940 | 4628 | 5.32 | 990 | 4977 | 5.72 | 1036 | 5316 | 6.11 | 1080 | 5646 | 6.49 | 1121 | 5970 | 6.87 |
| **9,000** | 990 | 5325 | 6.12 | 1037 | 5688 | 6.54 | 1082 | 6042 | 6.95 | 1124 | 6386 | 7.35 | 1163 | 6724 | 7.73 |
| **9,500** | 1039 | 6085 | 7.00 | 1085 | 6462 | 7.43 | 1128 | 6829 | 7.85 | 1168 | 7188 | 8.27 | 1207 | 7541 | 8.67 |
| **10,000** | 1089 | 6911 | 7.95 | 1133 | 7301 | 8.40 | 1174 | 7682 | 8.83 | 1213 | 8055 | 9.26 | 1251 | 8421 | 9.69 |
| **10,500** | 1139 | 7803 | 8.97 | 1181 | 8206 | 9.44 | 1221 | 8601 | 9.89 | 1259 | 8987 | 10.34 | 1295 | 9367 | 10.77 |
| **11,000** | 1189 | 8766 | 10.08 | 1229 | 9181 | 10.56 | 1268 | 9589 | 11.03 | 1305 | 9989 | 11.49 | — | — | — |
| **11,500** | 1240 | 9799 | 11.27 | — | — | — | — | — | — | — | — | — | — | — | — |
| **12,000** | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| **12,500** | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.2 | | | 1.4 | | | 1.6 | | | 1.8 | | | 2.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **7,500** | 1079 | 4926 | 5.67 | 1119 | 5212 | 5.99 | 1158 | 5495 | 6.32 | 1195 | 5776 | 6.64 | 1231 | 6055 | 6.96 |
| **8,000** | 1119 | 5578 | 6.42 | 1158 | 5878 | 6.76 | 1195 | 6174 | 7.10 | 1231 | 6468 | 7.44 | 1267 | 6761 | 7.78 |
| **8,500** | 1160 | 6288 | 7.23 | 1198 | 6601 | 7.59 | 1234 | 6912 | 7.95 | 1269 | 7219 | 8.30 | 1303 | 7524 | 8.65 |
| **9,000** | 1202 | 7056 | 8.12 | 1238 | 7384 | 8.49 | 1273 | 7708 | 8.87 | 1308 | 8029 | 9.23 | 1341 | 8347 | 9.60 |
| **9,500** | 1244 | 7887 | 9.07 | 1279 | 8228 | 9.46 | 1314 | 8566 | 9.85 | 1347 | 8900 | 10.24 | 1379 | 9231 | 10.62 |
| **10,000** | 1287 | 8781 | 10.10 | 1321 | 9137 | 10.51 | 1355 | 9488 | 10.91 | 1387 | 9836 | 11.31 | — | — | — |
| **10,500** | 1330 | 9742 | 11.20 | — | — | — | — | — | — | — | — | — | — | — | — |
| **11,000** | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| **11,500** | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| **12,000** | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| **12,500** | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

LEGEND

**Bhp** — Brake Horsepower Input to Fan
**FIOP** — Factory-Installed Option
**Watts** — Input Watts to Motor

*For standard motor with standard drive, the drive range is 799 to 965 rpm. For standard motor with alternate drive, the drive range is 717 to 882 rpm. For alternate motor with standard drive, the drive range is 939 to 1152 rpm. For alternate motor with optional drive, the drive range is 1152 to 1366 rpm. All other rpms require a field-supplied drive.

NOTES:
1. Maximum continuous Bhp for the standard motor is 8.63. Maximum continuous Bhp for the alternate motor is 11.50. The maximum continuous watts for the standard motor is 6438. The maximum continuous watts for the alternate motor is 8579. Do not adjust motor rpm such that motor maximum Bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses must be added to external static pressure before entering fan performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on economizer, filters, unit casing, and wet coil losses.
5. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Table 25 on page 37 for additional information.
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.

## Table 13 — Fan Performance — 48HGD014 (Low Heat Units) — Horizontal Discharge Units*

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.2 | | | 0.4 | | | 0.6 | | | 0.8 | | | 1.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **3500** | 457 | 568 | 0.65 | 538 | 747 | 0.86 | 614 | 938 | 1.08 | 690 | 1154 | 1.33 | 769 | 1399 | 1.61 |
| **4000** | 498 | 743 | 0.86 | 574 | 939 | 1.08 | 641 | 1135 | 1.31 | 707 | 1345 | 1.55 | 774 | 1577 | 1.81 |
| **4500** | 539 | 955 | 1.10 | 612 | 1164 | 1.34 | 674 | 1372 | 1.58 | 733 | 1586 | 1.82 | 791 | 1812 | 2.08 |
| **5000** | 581 | 1207 | 1.39 | 651 | 1426 | 1.64 | 710 | 1649 | 1.90 | 765 | 1871 | 2.15 | 817 | 2100 | 2.42 |
| **5500** | 625 | 1505 | 1.73 | 691 | 1727 | 1.99 | 748 | 1965 | 2.26 | 800 | 2199 | 2.53 | 849 | 2436 | 2.80 |
| **6000** | 671 | 1851 | 2.13 | 732 | 2071 | 2.38 | 787 | 2321 | 2.67 | 837 | 2570 | 2.96 | 884 | 2817 | 3.24 |
| **6500** | 718 | 2250 | 2.59 | 773 | 2462 | 2.83 | 827 | 2721 | 3.13 | 876 | 2984 | 3.43 | 920 | 3243 | 3.73 |
| **7000** | 766 | 2703 | 3.11 | 816 | 2905 | 3.34 | 867 | 3167 | 3.64 | 915 | 3443 | 3.96 | 958 | 3716 | 4.27 |
| **7500** | 814 | 3212 | 3.69 | 860 | 3402 | 3.91 | 908 | 3664 | 4.21 | 955 | 3950 | 4.54 | 997 | 4236 | 4.87 |
| **8000** | 863 | 3779 | 4.35 | 904 | 3960 | 4.55 | 950 | 4216 | 4.85 | 995 | 4507 | 5.18 | 1037 | 4805 | 5.53 |
| **8500** | 913 | 4406 | 5.07 | 950 | 4578 | 5.27 | 993 | 4826 | 5.55 | 1036 | 5118 | 5.89 | 1076 | 5425 | 6.24 |

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.2 | | | 1.4 | | | 1.6 | | | 1.8 | | | 2.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **3500** | † | † | † | † | † | † | † | † | † | † | † | † | † | † | † |
| **4000** | 842 | 1834 | 2.11 | 910 | 2113 | 2.43 | † | † | † | † | † | † | † | † | † |
| **4500** | 851 | 2057 | 2.37 | 911 | 2323 | 2.67 | 972 | 2609 | 3.00 | † | † | † | † | † | † |
| **5000** | 870 | 2341 | 2.69 | 923 | 2597 | 2.99 | 977 | 2870 | 3.30 | 1032 | 3162 | 3.64 | † | † | † |
| **5500** | 897 | 2678 | 3.08 | 945 | 2931 | 3.37 | 993 | 3197 | 3.68 | 1042 | 3477 | 4.00 | 1091 | 3774 | 4.34 |
| **6000** | 928 | 3066 | 3.53 | 972 | 3321 | 3.82 | 1016 | 3585 | 4.12 | 1060 | 3861 | 4.44 | 1104 | 4148 | 4.77 |
| **6500** | 963 | 3503 | 4.03 | 1004 | 3765 | 4.33 | 1045 | 4032 | 4.64 | 1085 | 4306 | 4.95 | 1125 | 4589 | 5.28 |
| **7000** | 999 | 3987 | 4.59 | 1038 | 4258 | 4.90 | 1077 | 4532 | 5.21 | 1114 | 4810 | 5.53 | 1152 | 5094 | 5.86 |
| **7500** | 1037 | 4520 | 5.20 | 1075 | 4802 | 5.52 | 1111 | 5085 | 5.85 | 1147 | 5370 | 6.18 | 1182 | 5658 | 6.51 |
| **8000** | 1075 | 5102 | 5.87 | 1112 | 5397 | 6.21 | 1148 | 5690 | 6.54 | 1182 | 5984 | 6.88 | 1215 | 6279 | 7.22 |
| **8500** | 1115 | 5735 | 6.60 | 1151 | 6042 | 6.95 | 1185 | 6348 | 7.30 | 1218 | 6652 | 7.65 | 1251 | 6957 | 8.00 |

LEGEND

**Bhp** — Brake Horsepower Input to Fan
**FIOP** — Factory-Installed Option
**Watts** — Input Watts to Motor

*For standard motor with standard drive, the drive range is 485 to 613 rpm (208/230 and 460-v units) or 472 to 619 (575-v units). For standard motor with alternate drive, the drive range is 618 to 789 rpm (208/230 and 460-v units) or 609 to 778 (575-v units). For alternate motor with standard drive, the drive range is 778 to 1021 rpm. For alternate motor with optional drive, the drive range is 1000 to 1227 rpm. All other rpms require a field-supplied drive.

†Contact Carrier Applications Engineering for operation in this region.

NOTES:

1. Maximum continuous Bhp for the standard motor is 4.25 (for 208/230 and 460-v units) or 3.45 (for 575-v units). Maximum continuous Bhp for the alternate motor is 5.75. The maximum continuous watts for the standard motor is 3171 (for 208/230 and 460-v units) or 2574 (for 575-v units). The maximum continuous watts for the alternate motor is 4290. Do not adjust motor rpm such that motor maximum Bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses must be added to external static pressure before entering fan performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on economizer, filters, unit casing, and wet coil losses.
5. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Table 25 on page 37 for additional information.
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.

## Table 14 — Fan Performance — 48HGF014 (High Heat Units) — Horizontal Discharge Units*

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.2 | | | 0.4 | | | 0.6 | | | 0.8 | | | 1.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **3500** | 469 | 589 | 0.68 | 549 | 762 | 0.88 | 624 | 951 | 1.09 | 701 | 1170 | 1.35 | 779 | 1420 | 1.63 |
| **4000** | 511 | 774 | 0.89 | 586 | 963 | 1.11 | 653 | 1154 | 1.33 | 719 | 1364 | 1.57 | 786 | 1599 | 1.84 |
| **4500** | 553 | 996 | 1.15 | 626 | 1202 | 1.38 | 688 | 1402 | 1.61 | 747 | 1611 | 1.85 | 805 | 1837 | 2.11 |
| **5000** | 597 | 1258 | 1.45 | 667 | 1480 | 1.70 | 726 | 1693 | 1.95 | 780 | 1909 | 2.20 | 833 | 2133 | 2.45 |
| **5500** | 642 | 1563 | 1.80 | 709 | 1798 | 2.07 | 766 | 2028 | 2.33 | 817 | 2253 | 2.59 | 866 | 2482 | 2.85 |
| **6000** | 688 | 1917 | 2.20 | 751 | 2160 | 2.48 | 807 | 2406 | 2.77 | 856 | 2645 | 3.04 | 902 | 2882 | 3.32 |
| **6500** | 735 | 2322 | 2.67 | 794 | 2568 | 2.95 | 848 | 2830 | 3.25 | 896 | 3083 | 3.55 | 941 | 3333 | 3.83 |
| **7000** | 784 | 2781 | 3.20 | 838 | 3027 | 3.48 | 891 | 3301 | 3.80 | 937 | 3570 | 4.11 | 980 | 3833 | 4.41 |
| **7500** | 833 | 3296 | 3.79 | 883 | 3539 | 4.07 | 933 | 3823 | 4.40 | 979 | 4107 | 4.72 | 1021 | 4384 | 5.04 |
| **8000** | 882 | 3870 | 4.45 | 928 | 4109 | 4.73 | 976 | 4398 | 5.06 | 1021 | 4696 | 5.40 | 1063 | 4987 | 5.74 |
| **8500** | 933 | 4504 | 5.18 | 974 | 4739 | 5.45 | 1020 | 5030 | 5.79 | 1064 | 5339 | 6.14 | 1104 | 5645 | 6.49 |

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.2 | | | 1.4 | | | 1.6 | | | 1.8 | | | 2.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **3500** | † | † | † | † | † | † | † | † | † | † | † | † | † | † | † |
| **4000** | 854 | 1861 | 2.14 | 921 | 2146 | 2.47 | † | † | † | † | † | † | † | † | † |
| **4500** | 864 | 2085 | 2.40 | 925 | 2356 | 2.71 | 985 | 2649 | 3.05 | 1045 | 2960 | 3.40 | † | † | † |
| **5000** | 885 | 2373 | 2.73 | 939 | 2631 | 3.03 | 993 | 2909 | 3.35 | 1047 | 3207 | 3.69 | 1101 | 3523 | 4.05 |
| **5500** | 914 | 2721 | 3.13 | 961 | 2972 | 3.42 | 1010 | 3239 | 3.73 | 1058 | 3524 | 4.05 | 1108 | 3826 | 4.40 |
| **6000** | 947 | 3125 | 3.59 | 991 | 3376 | 3.88 | 1034 | 3638 | 4.18 | 1078 | 3913 | 4.50 | 1123 | 4203 | 4.83 |
| **6500** | 983 | 3582 | 4.12 | 1024 | 3837 | 4.41 | 1064 | 4099 | 4.71 | 1105 | 4370 | 5.03 | 1145 | 4653 | 5.35 |
| **7000** | 1021 | 4093 | 4.71 | 1060 | 4354 | 5.01 | 1098 | 4620 | 5.31 | 1136 | 4892 | 5.63 | 1173 | 5173 | 5.95 |
| **7500** | 1061 | 4657 | 5.36 | 1098 | 4928 | 5.67 | 1134 | 5200 | 5.98 | 1170 | 5477 | 6.30 | 1205 | 5759 | 6.62 |
| **8000** | 1101 | 5274 | 6.07 | 1137 | 5556 | 6.39 | 1172 | 5838 | 6.71 | 1207 | 6121 | 7.04 | 1240 | 6408 | 7.37 |
| **8500** | 1142 | 5945 | 6.84 | 1178 | 6240 | 7.18 | 1212 | 6533 | 7.51 | 1245 | 6826 | 7.85 | 1277 | 7119 | 8.19 |

LEGEND

**Bhp** — Brake Horsepower Input to Fan
**FIOP** — Factory-Installed Option
**Watts** — Input Watts to Motor

*For standard motor with standard drive, the drive range is 485 to 613 rpm (208/230 and 460-v units) or 472 to 619 (575-v units). For standard motor with alternate drive, the drive range is 618 to 789 rpm (208/230 and 460-v units) or 609 to 778 (575-v units). For alternate motor with standard drive, the drive range is 778 to 1021 rpm. For alternate motor with optional drive, the drive range is 1000 to 1227 rpm. All other rpms require a field-supplied drive.

†Contact Carrier Applications Engineering for operation in this region.

NOTES:

1. Maximum continuous Bhp for the standard motor is 4.25 (for 208/230 and 460-v units) or 3.45 (for 575-v units). Maximum continuous Bhp for the alternate motor is 5.75. The maximum continuous watts for the standard motor is 3171 (for 208/230 and 460-v units) or 2574 (for 575-v units). The maximum continuous watts for the alternate motor is 4290. Do not adjust motor rpm such that motor maximum Bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses must be added to external static pressure before entering fan performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on economizer, filters, unit casing, and wet coil losses.
5. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Table 25 on page 37 for additional information.
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.

## Table 15 — Fan Performance — 48HGD016 (Low Heat Units) — Horizontal Discharge Units*

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.2 | | | 0.4 | | | 0.6 | | | 0.8 | | | 1.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **3500** | 457 | 568 | 0.65 | 538 | 747 | 0.86 | 614 | 938 | 1.08 | 690 | 1154 | 1.33 | 769 | 1399 | 1.61 |
| **4000** | 498 | 743 | 0.86 | 574 | 939 | 1.08 | 641 | 1135 | 1.31 | 707 | 1345 | 1.55 | 774 | 1577 | 1.81 |
| **4500** | 539 | 955 | 1.10 | 612 | 1164 | 1.34 | 674 | 1372 | 1.58 | 733 | 1586 | 1.82 | 791 | 1812 | 2.08 |
| **5000** | 581 | 1207 | 1.39 | 651 | 1426 | 1.64 | 710 | 1649 | 1.90 | 765 | 1871 | 2.15 | 817 | 2100 | 2.42 |
| **5500** | 625 | 1505 | 1.73 | 691 | 1727 | 1.99 | 748 | 1965 | 2.26 | 800 | 2199 | 2.53 | 849 | 2436 | 2.80 |
| **6000** | 671 | 1851 | 2.13 | 732 | 2071 | 2.38 | 787 | 2321 | 2.67 | 837 | 2570 | 2.96 | 884 | 2817 | 3.24 |
| **6500** | 718 | 2250 | 2.59 | 773 | 2462 | 2.83 | 827 | 2721 | 3.13 | 876 | 2984 | 3.43 | 920 | 3243 | 3.73 |
| **7000** | 766 | 2703 | 3.11 | 816 | 2905 | 3.34 | 867 | 3167 | 3.64 | 915 | 3443 | 3.96 | 958 | 3716 | 4.27 |
| **7500** | 814 | 3212 | 3.69 | 860 | 3402 | 3.91 | 908 | 3664 | 4.21 | 955 | 3950 | 4.54 | 997 | 4236 | 4.87 |
| **8000** | 863 | 3779 | 4.35 | 904 | 3960 | 4.55 | 950 | 4216 | 4.85 | 995 | 4507 | 5.18 | 1037 | 4805 | 5.53 |
| **8500** | 913 | 4406 | 5.07 | 950 | 4578 | 5.27 | 993 | 4826 | 5.55 | 1036 | 5118 | 5.89 | 1076 | 5425 | 6.24 |

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.2 | | | 1.4 | | | 1.6 | | | 1.8 | | | 2.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **3500** | † | † | † | † | † | † | † | † | † | † | † | † | † | † | † |
| **4000** | 842 | 1834 | 2.11 | 910 | 2113 | 2.43 | † | † | † | † | † | † | † | † | † |
| **4500** | 851 | 2057 | 2.37 | 911 | 2323 | 2.67 | 972 | 2609 | 3.00 | † | † | † | † | † | † |
| **5000** | 870 | 2341 | 2.69 | 923 | 2597 | 2.99 | 977 | 2870 | 3.30 | 1032 | 3162 | 3.64 | † | † | † |
| **5500** | 897 | 2678 | 3.08 | 945 | 2931 | 3.37 | 993 | 3197 | 3.68 | 1042 | 3477 | 4.00 | 1091 | 3774 | 4.34 |
| **6000** | 928 | 3066 | 3.53 | 972 | 3321 | 3.82 | 1016 | 3585 | 4.12 | 1060 | 3861 | 4.44 | 1104 | 4148 | 4.77 |
| **6500** | 963 | 3503 | 4.03 | 1004 | 3765 | 4.33 | 1045 | 4032 | 4.64 | 1085 | 4306 | 4.95 | 1125 | 4589 | 5.28 |
| **7000** | 999 | 3987 | 4.59 | 1038 | 4258 | 4.90 | 1077 | 4532 | 5.21 | 1114 | 4810 | 5.53 | 1152 | 5094 | 5.86 |
| **7500** | 1037 | 4520 | 5.20 | 1075 | 4802 | 5.52 | 1111 | 5085 | 5.85 | 1147 | 5370 | 6.18 | 1182 | 5658 | 6.51 |
| **8000** | 1075 | 5102 | 5.87 | 1112 | 5397 | 6.21 | 1148 | 5690 | 6.54 | 1182 | 5984 | 6.88 | 1215 | 6279 | 7.22 |
| **8500** | 1115 | 5735 | 6.60 | 1151 | 6042 | 6.95 | 1185 | 6348 | 7.30 | 1218 | 6652 | 7.65 | 1251 | 6957 | 8.00 |

LEGEND

**Bhp** — Brake Horsepower Input to Fan
**FIOP** — Factory-Installed Option
**Watts** — Input Watts to Motor

*For standard motor with standard drive, the drive range is 618 to 789 rpm (208/230 and 460-v units) or 609 to 778 (575-v units). For standard motor with alternate drive, the drive range is 485 to 613 rpm (208/230 and 460-v units) or 472 to 619 (575-v units). For alternate motor with standard drive, the drive range is 778 to 1021 rpm. For alternate motor with optional drive, the drive range is 1000 to 1227 rpm. All other rpms require a field-supplied drive.

†Contact Carrier Applications Engineering for operation in this region.

NOTES:

1. Maximum continuous Bhp for the standard motor is 4.25 (for 208/230 and 460-v units) or 3.45 (for 575-v units). Maximum continuous Bhp for the alternate motor is 5.75. The maximum continuous watts for the standard motor is 3171 (for 208/230 and 460-v units) or 2574 (for 575-v units). The maximum continuous watts for the alternate motor is 4290. Do not adjust motor rpm such that motor maximum Bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses must be added to external static pressure before entering fan performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on economizer, filters, unit casing, and wet coil losses.
5. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Table 25 on page 37 for additional information.
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.

## Table 16 — Fan Performance — 48HGF016 (High Heat Units) Horizontal Discharge Units*

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.2 | | | 0.4 | | | 0.6 | | | 0.8 | | | 1.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **3500** | 469 | 589 | 0.68 | 549 | 762 | 0.88 | 624 | 951 | 1.09 | 701 | 1170 | 1.35 | 779 | 1420 | 1.63 |
| **4000** | 511 | 774 | 0.89 | 586 | 963 | 1.11 | 653 | 1154 | 1.33 | 719 | 1364 | 1.57 | 786 | 1599 | 1.84 |
| **4500** | 553 | 996 | 1.15 | 626 | 1202 | 1.38 | 688 | 1402 | 1.61 | 747 | 1611 | 1.85 | 805 | 1837 | 2.11 |
| **5000** | 597 | 1258 | 1.45 | 667 | 1480 | 1.70 | 726 | 1693 | 1.95 | 780 | 1909 | 2.20 | 833 | 2133 | 2.45 |
| **5500** | 642 | 1563 | 1.80 | 709 | 1798 | 2.07 | 766 | 2028 | 2.33 | 817 | 2253 | 2.59 | 866 | 2482 | 2.85 |
| **6000** | 688 | 1917 | 2.20 | 751 | 2160 | 2.48 | 807 | 2406 | 2.77 | 856 | 2645 | 3.04 | 902 | 2882 | 3.32 |
| **6500** | 735 | 2322 | 2.67 | 794 | 2568 | 2.95 | 848 | 2830 | 3.25 | 896 | 3083 | 3.55 | 941 | 3333 | 3.83 |
| **7000** | 784 | 2781 | 3.20 | 838 | 3027 | 3.48 | 891 | 3301 | 3.80 | 937 | 3570 | 4.11 | 980 | 3833 | 4.41 |
| **7500** | 833 | 3296 | 3.79 | 883 | 3539 | 4.07 | 933 | 3823 | 4.40 | 979 | 4107 | 4.72 | 1021 | 4384 | 5.04 |
| **8000** | 882 | 3870 | 4.45 | 928 | 4109 | 4.73 | 976 | 4398 | 5.06 | 1021 | 4696 | 5.40 | 1063 | 4987 | 5.74 |
| **8500** | 933 | 4504 | 5.18 | 974 | 4739 | 5.45 | 1020 | 5030 | 5.79 | 1064 | 5339 | 6.14 | 1104 | 5645 | 6.49 |

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.2 | | | 1.4 | | | 1.6 | | | 1.8 | | | 2.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **3500** | † | † | † | † | † | † | † | † | † | † | † | † | † | † | † |
| **4000** | 854 | 1861 | 2.14 | 921 | 2146 | 2.47 | † | † | † | † | † | † | † | † | † |
| **4500** | 864 | 2085 | 2.40 | 925 | 2356 | 2.71 | 985 | 2649 | 3.05 | 1045 | 2960 | 3.40 | † | † | † |
| **5000** | 885 | 2373 | 2.73 | 939 | 2631 | 3.03 | 993 | 2909 | 3.35 | 1047 | 3207 | 3.69 | 1101 | 3523 | 4.05 |
| **5500** | 914 | 2721 | 3.13 | 961 | 2972 | 3.42 | 1010 | 3239 | 3.73 | 1058 | 3524 | 4.05 | 1108 | 3826 | 4.40 |
| **6000** | 947 | 3125 | 3.59 | 991 | 3376 | 3.88 | 1034 | 3638 | 4.18 | 1078 | 3913 | 4.50 | 1123 | 4203 | 4.83 |
| **6500** | 983 | 3582 | 4.12 | 1024 | 3837 | 4.41 | 1064 | 4099 | 4.71 | 1105 | 4370 | 5.03 | 1145 | 4653 | 5.35 |
| **7000** | 1021 | 4093 | 4.71 | 1060 | 4354 | 5.01 | 1098 | 4620 | 5.31 | 1136 | 4892 | 5.63 | 1173 | 5173 | 5.95 |
| **7500** | 1061 | 4657 | 5.36 | 1098 | 4928 | 5.67 | 1134 | 5200 | 5.98 | 1170 | 5477 | 6.30 | 1205 | 5759 | 6.62 |
| **8000** | 1101 | 5274 | 6.07 | 1137 | 5556 | 6.39 | 1172 | 5838 | 6.71 | 1207 | 6121 | 7.04 | 1240 | 6408 | 7.37 |
| **8500** | 1142 | 5945 | 6.84 | 1178 | 6240 | 7.18 | 1212 | 6533 | 7.51 | 1245 | 6826 | 7.85 | 1277 | 7119 | 8.19 |

LEGEND

**Bhp** — Brake Horsepower Input to Fan
**FIOP** — Factory-Installed Option
**Watts** — Input Watts to Motor

*For standard motor with standard drive, the drive range is 618 to 789 rpm (208/230 and 460-v units) or 609 to 778 (575-v units). For standard motor with alternate drive, the drive range is 485 to 613 rpm (208/230 and 460-v units) or 472 to 619 (575-v units). For alternate motor with standard drive, the drive range is 778 to 1021 rpm. For alternate motor with optional drive, the drive range is 1000 to 1227 rpm. All other rpms require a field-supplied drive.

†Contact Carrier Applications Engineering for operation in this region.

NOTES:

1. Maximum continuous Bhp for the standard motor is 4.25 (for 208/230 and 460-v units) or 3.45 (for 575-v units). Maximum continuous Bhp for the alternate motor is 5.75. The maximum continuous watts for the standard motor is 3171 (for 208/230 and 460-v units) or 2574 (for 575-v units). The maximum continuous watts for the alternate motor is 4290. Do not adjust motor rpm such that motor maximum Bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses must be added to external static pressure before entering fan performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on economizer, filters, unit casing, and wet coil losses.
5. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Table 25 on page 37 for additional information.
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.

## Table 17 — Fan Performance — 48HGD020 (Low Heat Units) — Horizontal Discharge Units*

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.2 | | | 0.4 | | | 0.6 | | | 0.8 | | | 1.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **3500** | 457 | 568 | 0.65 | 538 | 747 | 0.86 | 614 | 938 | 1.08 | 690 | 1154 | 1.33 | 769 | 1399 | 1.61 |
| **4000** | 498 | 743 | 0.86 | 574 | 939 | 1.08 | 641 | 1135 | 1.31 | 707 | 1345 | 1.55 | 774 | 1577 | 1.81 |
| **4500** | 539 | 955 | 1.10 | 612 | 1164 | 1.34 | 674 | 1372 | 1.58 | 733 | 1586 | 1.82 | 791 | 1812 | 2.08 |
| **5000** | 581 | 1207 | 1.39 | 651 | 1426 | 1.64 | 710 | 1649 | 1.90 | 765 | 1871 | 2.15 | 817 | 2100 | 2.42 |
| **5500** | 625 | 1505 | 1.73 | 691 | 1727 | 1.99 | 748 | 1965 | 2.26 | 800 | 2199 | 2.53 | 849 | 2436 | 2.80 |
| **6000** | 671 | 1851 | 2.13 | 732 | 2071 | 2.38 | 787 | 2321 | 2.67 | 837 | 2570 | 2.96 | 884 | 2817 | 3.24 |
| **6500** | 718 | 2250 | 2.59 | 773 | 2462 | 2.83 | 827 | 2721 | 3.13 | 876 | 2984 | 3.43 | 920 | 3243 | 3.73 |
| **7000** | 766 | 2703 | 3.11 | 816 | 2905 | 3.34 | 867 | 3167 | 3.64 | 915 | 3443 | 3.96 | 958 | 3716 | 4.27 |
| **7500** | 814 | 3212 | 3.69 | 860 | 3402 | 3.91 | 908 | 3664 | 4.21 | 955 | 3950 | 4.54 | 997 | 4236 | 4.87 |
| **8000** | 863 | 3779 | 4.35 | 904 | 3960 | 4.55 | 950 | 4216 | 4.85 | 995 | 4507 | 5.18 | 1037 | 4805 | 5.53 |
| **8500** | 913 | 4406 | 5.07 | 950 | 4578 | 5.27 | 993 | 4826 | 5.55 | 1036 | 5118 | 5.89 | 1076 | 5425 | 6.24 |

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.2 | | | 1.4 | | | 1.6 | | | 1.8 | | | 2.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **3500** | † | † | † | † | † | † | † | † | † | † | † | † | † | † | † |
| **4000** | 842 | 1834 | 2.11 | 910 | 2113 | 2.43 | † | † | † | † | † | † | † | † | † |
| **4500** | 851 | 2057 | 2.37 | 911 | 2323 | 2.67 | 972 | 2609 | 3.00 | † | † | † | † | † | † |
| **5000** | 870 | 2341 | 2.69 | 923 | 2597 | 2.99 | 977 | 2870 | 3.30 | 1032 | 3162 | 3.64 | † | † | † |
| **5500** | 897 | 2678 | 3.08 | 945 | 2931 | 3.37 | 993 | 3197 | 3.68 | 1042 | 3477 | 4.00 | 1091 | 3774 | 4.34 |
| **6000** | 928 | 3066 | 3.53 | 972 | 3321 | 3.82 | 1016 | 3585 | 4.12 | 1060 | 3861 | 4.44 | 1104 | 4148 | 4.77 |
| **6500** | 963 | 3503 | 4.03 | 1004 | 3765 | 4.33 | 1045 | 4032 | 4.64 | 1085 | 4306 | 4.95 | 1125 | 4589 | 5.28 |
| **7000** | 999 | 3987 | 4.59 | 1038 | 4258 | 4.90 | 1077 | 4532 | 5.21 | 1114 | 4810 | 5.53 | 1152 | 5094 | 5.86 |
| **7500** | 1037 | 4520 | 5.20 | 1075 | 4802 | 5.52 | 1111 | 5085 | 5.85 | 1147 | 5370 | 6.18 | 1182 | 5658 | 6.51 |
| **8000** | 1075 | 5102 | 5.87 | 1112 | 5397 | 6.21 | 1148 | 5690 | 6.54 | 1182 | 5984 | 6.88 | 1215 | 6279 | 7.22 |
| **8500** | 1115 | 5735 | 6.60 | 1151 | 6042 | 6.95 | 1185 | 6348 | 7.30 | 1218 | 6652 | 7.65 | 1251 | 6957 | 8.00 |

LEGEND

**Bhp** — Brake Horsepower Input to Fan
**FIOP** — Factory-Installed Option
**Watts** — Input Watts to Motor

*For standard motor with standard drive, the drive range is 658 to 808 rpm. For standard motor with alternate drive, the drive range is 794 to 974 rpm. For alternate motor with standard drive, the drive range is 949 to 1145 rpm. For alternate motor with optional drive, the drive range is 1126 to 1328 rpm. All other rpms require a field-supplied drive.

†Contact Carrier Applications Engineering for operation in this region.

NOTES:

1. Maximum continuous Bhp for the standard motor is 5.75. Maximum continuous Bhp for the alternate motor is 8.63. The maximum continuous watts for the standard motor is 4290. The maximum continuous watts for the alternate motor is 6438. Do not adjust motor rpm such that motor maximum Bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses must be added to external static pressure before entering fan performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on economizer, filters, unit casing, and wet coil losses.
5. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Table 25 on page 37 for additional information.
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.

## Table 18 — Fan Performance — 48HGF020 (High Heat Units) — Horizontal Discharge Units*

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.2 | | | 0.4 | | | 0.6 | | | 0.8 | | | 1.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **3500** | 469 | 589 | 0.68 | 549 | 762 | 0.88 | 624 | 951 | 1.09 | 701 | 1170 | 1.35 | 779 | 1420 | 1.63 |
| **4000** | 511 | 774 | 0.89 | 586 | 963 | 1.11 | 653 | 1154 | 1.33 | 719 | 1364 | 1.57 | 786 | 1599 | 1.84 |
| **4500** | 553 | 996 | 1.15 | 626 | 1202 | 1.38 | 688 | 1402 | 1.61 | 747 | 1611 | 1.85 | 805 | 1837 | 2.11 |
| **5000** | 597 | 1258 | 1.45 | 667 | 1480 | 1.70 | 726 | 1693 | 1.95 | 780 | 1909 | 2.20 | 833 | 2133 | 2.45 |
| **5500** | 642 | 1563 | 1.80 | 709 | 1798 | 2.07 | 766 | 2028 | 2.33 | 817 | 2253 | 2.59 | 866 | 2482 | 2.85 |
| **6000** | 688 | 1917 | 2.20 | 751 | 2160 | 2.48 | 807 | 2406 | 2.77 | 856 | 2645 | 3.04 | 902 | 2882 | 3.32 |
| **6500** | 735 | 2322 | 2.67 | 794 | 2568 | 2.95 | 848 | 2830 | 3.25 | 896 | 3083 | 3.55 | 941 | 3333 | 3.83 |
| **7000** | 784 | 2781 | 3.20 | 838 | 3027 | 3.48 | 891 | 3301 | 3.80 | 937 | 3570 | 4.11 | 980 | 3833 | 4.41 |
| **7500** | 833 | 3296 | 3.79 | 883 | 3539 | 4.07 | 933 | 3823 | 4.40 | 979 | 4107 | 4.72 | 1021 | 4384 | 5.04 |
| **8000** | 882 | 3870 | 4.45 | 928 | 4109 | 4.73 | 976 | 4398 | 5.06 | 1021 | 4696 | 5.40 | 1063 | 4987 | 5.74 |
| **8500** | 933 | 4504 | 5.18 | 974 | 4739 | 5.45 | 1020 | 5030 | 5.79 | 1064 | 5339 | 6.14 | 1104 | 5645 | 6.49 |

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.2 | | | 1.4 | | | 1.6 | | | 1.8 | | | 2.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **3500** | † | † | † | † | † | † | † | † | † | † | † | † | † | † | † |
| **4000** | 854 | 1861 | 2.14 | 921 | 2146 | 2.47 | † | † | † | † | † | † | † | † | † |
| **4500** | 864 | 2085 | 2.40 | 925 | 2356 | 2.71 | 985 | 2649 | 3.05 | 1045 | 2960 | 3.40 | † | † | † |
| **5000** | 885 | 2373 | 2.73 | 939 | 2631 | 3.03 | 993 | 2909 | 3.35 | 1047 | 3207 | 3.69 | 1101 | 3523 | 4.05 |
| **5500** | 914 | 2721 | 3.13 | 961 | 2972 | 3.42 | 1010 | 3239 | 3.73 | 1058 | 3524 | 4.05 | 1108 | 3826 | 4.40 |
| **6000** | 947 | 3125 | 3.59 | 991 | 3376 | 3.88 | 1034 | 3638 | 4.18 | 1078 | 3913 | 4.50 | 1123 | 4203 | 4.83 |
| **6500** | 983 | 3582 | 4.12 | 1024 | 3837 | 4.41 | 1064 | 4099 | 4.71 | 1105 | 4370 | 5.03 | 1145 | 4653 | 5.35 |
| **7000** | 1021 | 4093 | 4.71 | 1060 | 4354 | 5.01 | 1098 | 4620 | 5.31 | 1136 | 4892 | 5.63 | 1173 | 5173 | 5.95 |
| **7500** | 1061 | 4657 | 5.36 | 1098 | 4928 | 5.67 | 1134 | 5200 | 5.98 | 1170 | 5477 | 6.30 | 1205 | 5759 | 6.62 |
| **8000** | 1101 | 5274 | 6.07 | 1137 | 5556 | 6.39 | 1172 | 5838 | 6.71 | 1207 | 6121 | 7.04 | 1240 | 6408 | 7.37 |
| **8500** | 1142 | 5945 | 6.84 | 1178 | 6240 | 7.18 | 1212 | 6533 | 7.51 | 1245 | 6826 | 7.85 | 1277 | 7119 | 8.19 |

LEGEND

**Bhp** — Brake Horsepower Input to Fan
**FIOP** — Factory-Installed Option
**Watts** — Input Watts to Motor

*For standard motor with standard drive, the drive range is 658 to 808 rpm. For standard motor with alternate drive, the drive range is 794 to 974 rpm. For alternate motor with standard drive, the drive range is 949 to 1145 rpm. For alternate motor with optional drive, the drive range is 1126 to 1328 rpm. All other rpms require a field-supplied drive.

†Contact Carrier Applications Engineering for operation in this region.

NOTES:

1. Maximum continuous Bhp for the standard motor is 5.75. Maximum continuous Bhp for the alternate motor is 8.63. The maximum continuous watts for the standard motor is 4290. The maximum continuous watts for the alternate motor is 6438. Do not adjust motor rpm such that motor maximum Bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses must be added to external static pressure before entering fan performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on economizer, filters, unit casing, and wet coil losses.
5. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Table 25 on page 37 for additional information.
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.

## Table 19 — Fan Performance — 48HGD024 (Low Heat Units) — Horizontal Discharge Units*

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.2 | | | 0.4 | | | 0.6 | | | 0.8 | | | 1.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **5,000** | 591 | 1234 | 1.42 | 659 | 1456 | 1.67 | 718 | 1679 | 1.93 | 772 | 1902 | 2.19 | 825 | 2133 | 2.45 |
| **5,500** | 636 | 1536 | 1.77 | 701 | 1766 | 2.03 | 757 | 2003 | 2.30 | 808 | 2238 | 2.57 | 857 | 2475 | 2.85 |
| **6,000** | 682 | 1886 | 2.17 | 743 | 2118 | 2.44 | 797 | 2369 | 2.73 | 846 | 2618 | 3.01 | 892 | 2865 | 3.30 |
| **6,500** | 729 | 2288 | 2.63 | 786 | 2518 | 2.90 | 838 | 2780 | 3.20 | 886 | 3043 | 3.50 | 930 | 3303 | 3.80 |
| **7,000** | 778 | 2745 | 3.16 | 829 | 2968 | 3.41 | 880 | 3239 | 3.72 | 927 | 3515 | 4.04 | 969 | 3787 | 4.36 |
| **7,500** | 826 | 3257 | 3.75 | 874 | 3474 | 4.00 | 922 | 3747 | 4.31 | 968 | 4035 | 4.64 | 1009 | 4322 | 4.97 |
| **8,000** | 876 | 3829 | 4.40 | 920 | 4039 | 4.64 | 966 | 4311 | 4.96 | 1009 | 4607 | 5.30 | 1050 | 4906 | 5.64 |
| **8,500** | 926 | 4461 | 5.13 | 966 | 4663 | 5.36 | 1009 | 4933 | 5.67 | 1052 | 5235 | 6.02 | 1091 | 5544 | 6.38 |
| **9,000** | 976 | 5156 | 5.93 | 1013 | 5352 | 6.16 | 1054 | 5616 | 6.46 | 1094 | 5920 | 6.81 | 1133 | 6238 | 7.17 |
| **9,500** | 1027 | 5916 | 6.80 | 1061 | 6106 | 7.02 | 1099 | 6364 | 7.32 | 1138 | 6667 | 7.67 | 1175 | 6991 | 8.04 |
| **10,000** | 1078 | 6742 | 7.75 | 1109 | 6929 | 7.97 | 1145 | 7179 | 8.26 | 1182 | 7479 | 8.60 | 1218 | 7806 | 8.98 |

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.2 | | | 1.4 | | | 1.6 | | | 1.8 | | | 2.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **5,000** | 878 | 2376 | 2.73 | 931 | 2635 | 3.03 | 985 | 2912 | 3.35 | 1040 | 3207 | 3.69 | 1095 | 3519 | 4.05 |
| **5,500** | 905 | 2720 | 3.13 | 953 | 2975 | 3.42 | 1001 | 3244 | 3.73 | 1050 | 3528 | 4.06 | 1100 | 3828 | 4.40 |
| **6,000** | 937 | 3116 | 3.58 | 981 | 3374 | 3.88 | 1025 | 3641 | 4.19 | 1069 | 3919 | 4.51 | 1114 | 4209 | 4.84 |
| **6,500** | 972 | 3563 | 4.10 | 1013 | 3827 | 4.40 | 1054 | 4096 | 4.71 | 1095 | 4373 | 5.03 | 1135 | 4659 | 5.36 |
| **7,000** | 1010 | 4059 | 4.67 | 1049 | 4332 | 4.98 | 1087 | 4607 | 5.30 | 1125 | 4887 | 5.62 | 1162 | 5173 | 5.95 |
| **7,500** | 1049 | 4606 | 5.30 | 1086 | 4888 | 5.62 | 1122 | 5172 | 5.95 | 1158 | 5459 | 6.28 | 1193 | 5750 | 6.61 |
| **8,000** | 1088 | 5203 | 5.98 | 1125 | 5498 | 6.32 | 1160 | 5792 | 6.66 | 1194 | 6087 | 7.00 | 1227 | 6384 | 7.34 |
| **8,500** | 1129 | 5854 | 6.73 | 1164 | 6161 | 7.09 | 1198 | 6467 | 7.44 | 1231 | 6771 | 7.79 | 1263 | 7077 | 8.14 |
| **9,000** | 1170 | 6559 | 7.54 | 1204 | 6879 | 7.91 | 1238 | 7197 | 8.28 | 1270 | 7512 | 8.64 | 1301 | 7828 | 9.00 |
| **9,500** | 1211 | 7322 | 8.42 | 1245 | 7653 | 8.80 | 1278 | 7983 | 9.18 | 1309 | 8311 | 9.56 | 1339 | 8637 | 9.93 |
| **10,000** | 1253 | 8144 | 9.37 | 1287 | 8487 | 9.76 | 1318 | 8828 | 10.15 | 1349 | 9168 | 10.54 | 1379 | 9506 | 10.93 |

LEGEND

**Bhp** — Brake Horsepower Input to Fan
**FIOP** — Factory-Installed Option
**Watts** — Input Watts to Motor

*For standard motor with standard drive, the drive range is 658 to 808 rpm. For standard motor with alternate drive, the drive range is 794 to 974 rpm. For alternate motor with standard drive, the drive range is 949 to 1145 rpm. For alternate motor with optional drive, the drive range is 1126 to 1328 rpm. All other rpms require a field-supplied drive.

NOTES:
1. Maximum continuous Bhp for the standard motor is 5.75. Maximum continuous Bhp for the alternate motor is 8.63. The maximum continuous watts for the standard motor is 4290. The maximum continuous watts for the alternate motor is 6438. Do not adjust motor rpm such that motor maximum Bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses must be added to external static pressure before entering fan performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on economizer, filters, unit casing, and wet coil losses.
5. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Table 25 on page 37 for additional information.
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.

## Table 20 — Fan Performance — 48HGF024 (High Heat Units) — Horizontal Discharge Units*

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.2 | | | 0.4 | | | 0.6 | | | 0.8 | | | 1.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **5,000** | 607 | 1287 | 1.48 | 675 | 1509 | 1.74 | 733 | 1723 | 1.98 | 787 | 1939 | 2.23 | 840 | 2166 | 2.49 |
| **5,500** | 653 | 1599 | 1.84 | 719 | 1836 | 2.11 | 774 | 2065 | 2.37 | 825 | 2291 | 2.63 | 874 | 2522 | 2.90 |
| **6,000** | 700 | 1959 | 2.25 | 763 | 2208 | 2.54 | 817 | 2453 | 2.82 | 865 | 2691 | 3.09 | 911 | 2930 | 3.37 |
| **6,500** | 748 | 2371 | 2.73 | 807 | 2627 | 3.02 | 860 | 2888 | 3.32 | 907 | 3140 | 3.61 | 950 | 3390 | 3.90 |
| **7,000** | 797 | 2837 | 3.26 | 852 | 3097 | 3.56 | 903 | 3372 | 3.88 | 949 | 3640 | 4.19 | 991 | 3902 | 4.49 |
| **7,500** | 847 | 3359 | 3.86 | 898 | 3621 | 4.16 | 947 | 3908 | 4.49 | 992 | 4191 | 4.82 | 1033 | 4467 | 5.14 |
| **8,000** | 897 | 3941 | 4.53 | 944 | 4203 | 4.83 | 992 | 4499 | 5.17 | 1036 | 4795 | 5.52 | 1076 | 5086 | 5.85 |
| **8,500** | 947 | 4583 | 5.27 | 991 | 4844 | 5.57 | 1037 | 5146 | 5.92 | 1080 | 5456 | 6.28 | 1119 | 5761 | 6.63 |
| **9,000** | 998 | 5290 | 6.08 | 1039 | 5549 | 6.38 | 1082 | 5855 | 6.73 | 1124 | 6176 | 7.10 | 1163 | 6494 | 7.47 |
| **9,500** | 1050 | 6062 | 6.97 | 1088 | 6320 | 7.27 | 1129 | 6628 | 7.62 | 1169 | 6956 | 8.00 | 1207 | 7287 | 8.38 |
| **10,000** | 1102 | 6902 | 7.94 | 1137 | 7159 | 8.23 | 1175 | 7467 | 8.59 | 1214 | 7801 | 8.97 | 1251 | 8143 | 9.37 |

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.2 | | | 1.4 | | | 1.6 | | | 1.8 | | | 2.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **5,000** | 893 | 2409 | 2.77 | 946 | 2670 | 3.07 | 1001 | 2952 | 3.40 | 1055 | 3253 | 3.74 | 1109 | 3573 | 4.11 |
| **5,500** | 922 | 2763 | 3.18 | 970 | 3017 | 3.47 | 1018 | 3288 | 3.78 | 1067 | 3576 | 4.11 | 1116 | 3882 | 4.46 |
| **6,000** | 955 | 3174 | 3.65 | 999 | 3427 | 3.94 | 1043 | 3693 | 4.25 | 1088 | 3972 | 4.57 | 1132 | 4266 | 4.91 |
| **6,500** | 992 | 3641 | 4.19 | 1033 | 3897 | 4.48 | 1074 | 4162 | 4.79 | 1114 | 4437 | 5.10 | 1155 | 4724 | 5.43 |
| **7,000** | 1032 | 4163 | 4.79 | 1070 | 4426 | 5.09 | 1108 | 4693 | 5.40 | 1146 | 4968 | 5.71 | 1184 | 5252 | 6.04 |
| **7,500** | 1072 | 4739 | 5.45 | 1109 | 5011 | 5.76 | 1145 | 5285 | 6.08 | 1181 | 5564 | 6.40 | 1216 | 5848 | 6.73 |
| **8,000** | 1114 | 5371 | 6.18 | 1150 | 5654 | 6.50 | 1184 | 5936 | 6.83 | 1218 | 6222 | 7.16 | 1252 | 6511 | 7.49 |
| **8,500** | 1156 | 6060 | 6.97 | 1191 | 6355 | 7.31 | 1225 | 6648 | 7.65 | 1257 | 6941 | 7.98 | 1289 | 7236 | 8.32 |
| **9,000** | 1199 | 6807 | 7.83 | 1233 | 7115 | 8.18 | 1266 | 7419 | 8.53 | 1298 | 7722 | 8.88 | 1329 | 8026 | 9.23 |
| **9,500** | 1242 | 7614 | 8.76 | 1276 | 7934 | 9.13 | 1308 | 8252 | 9.49 | 1339 | 8566 | 9.85 | 1369 | 8879 | 10.21 |
| **10,000** | 1286 | 8482 | 9.76 | 1319 | 8817 | 10.14 | 1351 | 9147 | 10.52 | 1381 | 9472 | 10.89 | — | — | — |

LEGEND

**Bhp** — Brake Horsepower Input to Fan
**FIOP** — Factory-Installed Option
**Watts** — Input Watts to Motor

*For standard motor with standard drive, the drive range is 658 to 808 rpm. For standard motor with alternate drive, the drive range is 794 to 974 rpm. For alternate motor with standard drive, the drive range is 949 to 1145 rpm. For alternate motor with optional drive, the drive range is 1126 to 1328 rpm. All other rpms require a field-supplied drive.

NOTES:
1. Maximum continuous Bhp for the standard motor is 5.75. Maximum continuous Bhp for the alternate motor is 8.63. The maximum continuous watts for the standard motor is 4290. The maximum continuous watts for the alternate motor is 6438. Do not adjust motor rpm such that motor maximum Bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses must be added to external static pressure before entering fan performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on economizer, filters, unit casing, and wet coil losses.
5. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Table 25 on page 37 for additional information.
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.

## Table 21 — Fan Performance — 48HGD028 (Low Heat Units) — Horizontal Discharge Units*

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.2 | | | 0.4 | | | 0.6 | | | 0.8 | | | 1.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **7,500** | 826 | 3257 | 3.75 | 874 | 3474 | 4.00 | 923 | 3748 | 4.31 | 968 | 4035 | 4.64 | 1009 | 4322 | 4.97 |
| **8,000** | 876 | 3829 | 4.40 | 920 | 4039 | 4.64 | 966 | 4311 | 4.96 | 1009 | 4607 | 5.30 | 1050 | 4906 | 5.64 |
| **8,500** | 926 | 4461 | 5.13 | 966 | 4663 | 5.36 | 1009 | 4933 | 5.67 | 1052 | 5235 | 6.02 | 1091 | 5544 | 6.38 |
| **9,000** | 976 | 5156 | 5.93 | 1013 | 5352 | 6.16 | 1054 | 5616 | 6.46 | 1094 | 5920 | 6.81 | 1133 | 6238 | 7.17 |
| **9,500** | 1027 | 5916 | 6.80 | 1061 | 6106 | 7.02 | 1099 | 6364 | 7.32 | 1138 | 6667 | 7.67 | 1175 | 6991 | 8.04 |
| **10,000** | 1078 | 6742 | 7.75 | 1109 | 6929 | 7.97 | 1145 | 7179 | 8.26 | 1182 | 7479 | 8.60 | 1218 | 7806 | 8.98 |
| **10,500** | 1129 | 7639 | 8.79 | 1158 | 7821 | 8.99 | 1191 | 8064 | 9.27 | 1226 | 8358 | 9.61 | 1261 | 8686 | 9.99 |
| **11,000** | 1180 | 8606 | 9.90 | 1207 | 8784 | 10.10 | 1238 | 9021 | 10.38 | 1272 | 9310 | 10.71 | 1305 | 9635 | 11.08 |
| **11,500** | 1231 | 9646 | 11.09 | 1257 | 9822 | 11.30 | — | — | — | — | — | — | — | — | — |
| **12,000** | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| **12,500** | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.2 | | | 1.4 | | | 1.6 | | | 1.8 | | | 2.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| **7,500** | 1049 | 4606 | 5.30 | 1086 | 4888 | 5.62 | 1122 | 5172 | 5.95 | 1158 | 5459 | 6.28 | 1193 | 5750 | 6.61 |
| **8,000** | 1088 | 5203 | 5.98 | 1125 | 5498 | 6.32 | 1160 | 5792 | 6.66 | 1194 | 6087 | 7.00 | 1227 | 6384 | 7.34 |
| **8,500** | 1129 | 5854 | 6.73 | 1164 | 6161 | 7.09 | 1198 | 6467 | 7.44 | 1231 | 6771 | 7.79 | 1263 | 7077 | 8.14 |
| **9,000** | 1170 | 6559 | 7.54 | 1204 | 6879 | 7.91 | 1238 | 7197 | 8.28 | 1270 | 7512 | 8.64 | 1301 | 7828 | 9.00 |
| **9,500** | 1211 | 7322 | 8.42 | 1245 | 7653 | 8.80 | 1278 | 7983 | 9.18 | 1309 | 8311 | 9.56 | 1339 | 8637 | 9.93 |
| **10,000** | 1253 | 8144 | 9.37 | 1287 | 8487 | 9.76 | 1318 | 8828 | 10.15 | 1349 | 9168 | 10.54 | 1379 | 9506 | 10.93 |
| **10,500** | 1296 | 9031 | 10.39 | 1328 | 9382 | 10.79 | 1360 | 9734 | 11.20 | — | — | — | — | — | — |
| **11,000** | 1338 | 9983 | 11.48 | — | — | — | — | — | — | — | — | — | — | — | — |
| **11,500** | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| **12,000** | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| **12,500** | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

LEGEND

**Bhp** — Brake Horsepower Input to Fan
**FIOP** — Factory-Installed Option
**Watts** — Input Watts to Motor

*For standard motor with standard drive, the drive range is 799 to 965 rpm. For standard motor with alternate drive, the drive range is 717 to 882 rpm. For alternate motor with standard drive, the drive range is 939 to 1152 rpm. For alternate motor with optional drive, the drive range is 1152 to 1366 rpm. All other rpms require a field-supplied drive.

NOTES:
1. Maximum continuous Bhp for the standard motor is 8.63. Maximum continuous Bhp for the alternate motor is 11.50. The maximum continuous watts for the standard motor is 6438. The maximum continuous watts for the alternate motor is 8579. Do not adjust motor rpm such that motor maximum Bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses must be added to external static pressure before entering fan performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on economizer, filters, unit casing, and wet coil losses.
5. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Table 25 on page 37 for additional information.
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.

## Table 22 — Fan Performance — 48HGF028 (High Heat Units) — Horizontal Discharge Units*

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.2 | | | 0.4 | | | 0.6 | | | 0.8 | | | 1.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| 7,500 | 847 | 3359 | 3.86 | 898 | 3621 | 4.16 | 947 | 3908 | 4.49 | 992 | 4191 | 4.82 | 1033 | 4467 | 5.14 |
| 8,000 | 897 | 3941 | 4.53 | 944 | 4203 | 4.83 | 992 | 4499 | 5.17 | 1036 | 4795 | 5.52 | 1076 | 5086 | 5.85 |
| 8,500 | 947 | 4583 | 5.27 | 991 | 4844 | 5.57 | 1037 | 5146 | 5.92 | 1080 | 5456 | 6.28 | 1119 | 5761 | 6.63 |
| 9,000 | 998 | 5290 | 6.08 | 1039 | 5549 | 6.38 | 1082 | 5855 | 6.73 | 1124 | 6176 | 7.10 | 1163 | 6494 | 7.47 |
| 9,500 | 1050 | 6062 | 6.97 | 1088 | 6320 | 7.27 | 1129 | 6628 | 7.62 | 1169 | 6956 | 8.00 | 1207 | 7287 | 8.38 |
| 10,000 | 1102 | 6902 | 7.94 | 1137 | 7159 | 8.23 | 1175 | 7467 | 8.59 | 1214 | 7801 | 8.97 | 1251 | 8143 | 9.37 |
| 10,500 | 1153 | 7813 | 8.99 | 1186 | 8068 | 9.28 | 1223 | 8374 | 9.63 | 1260 | 8713 | 10.02 | 1296 | 9064 | 10.42 |
| 11,000 | 1205 | 8795 | 10.12 | 1236 | 9049 | 10.41 | 1271 | 9354 | 10.76 | 1306 | 9695 | 11.15 | — | — | — |
| 11,500 | 1258 | 9851 | 11.33 | — | — | — | — | — | — | — | — | — | — | — | — |
| 12,000 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 12,500 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| AIRFLOW (cfm) | AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.2 | | | 1.4 | | | 1.6 | | | 1.8 | | | 2.0 | | |
| | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp | Rpm | Watts | Bhp |
| 7,500 | 1072 | 4739 | 5.45 | 1109 | 5011 | 5.76 | 1145 | 5285 | 6.08 | 1181 | 5564 | 6.40 | 1216 | 5848 | 6.73 |
| 8,000 | 1114 | 5371 | 6.18 | 1150 | 5654 | 6.50 | 1184 | 5936 | 6.83 | 1218 | 6222 | 7.16 | 1252 | 6511 | 7.49 |
| 8,500 | 1156 | 6060 | 6.97 | 1191 | 6355 | 7.31 | 1225 | 6648 | 7.65 | 1257 | 6941 | 7.98 | 1289 | 7236 | 8.32 |
| 9,000 | 1199 | 6807 | 7.83 | 1233 | 7115 | 8.18 | 1266 | 7419 | 8.53 | 1298 | 7722 | 8.88 | 1329 | 8026 | 9.23 |
| 9,500 | 1242 | 7614 | 8.76 | 1276 | 7934 | 9.13 | 1308 | 8252 | 9.49 | 1339 | 8566 | 9.85 | 1369 | 8879 | 10.21 |
| 10,000 | 1286 | 8482 | 9.76 | 1319 | 8817 | 10.14 | 1351 | 9147 | 10.52 | 1381 | 9472 | 10.89 | — | — | — |
| 10,500 | 1330 | 9415 | 10.83 | 1363 | 9762 | 11.23 | — | — | — | — | — | — | — | — | — |
| 11,000 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 11,500 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 12,000 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 12,500 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

LEGEND

**Bhp** — Brake Horsepower Input to Fan
**FIOP** — Factory-Installed Option
**Watts** — Input Watts to Motor

*For standard motor with standard drive, the drive range is 799 to 965 rpm. For standard motor with alternate drive, the drive range is 717 to 882 rpm. For alternate motor with standard drive, the drive range is 939 to 1152 rpm. For alternate motor with optional drive, the drive range is 1152 to 1366 rpm. All other rpms require a field-supplied drive.

NOTES:
1. Maximum continuous Bhp for the standard motor is 8.63. Maximum continuous Bhp for the alternate motor is 11.50. The maximum continuous watts for the standard motor is 6438. The maximum continuous watts for the alternate motor is 8579. Do not adjust motor rpm such that motor maximum Bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses must be added to external static pressure before entering fan performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on economizer, filters, unit casing, and wet coil losses.
5. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Table 25 on page 37 for additional information.
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.

## Table 23 — Power Exhaust Fan Performance

| AIRFLOW | LOW SPEED | | | | | | MEDIUM SPEED | | | | | | HIGH SPEED | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 208 V | | | 230,460,575 V | | | 208 V | | | 230,460,575 V | | | 208 V | | | 230,460,575 V | | |
| | ESP | Bhp | Watts | ESP | Bhp | Watts | ESP | Bhp | Watts | ESP | Bhp | Watts | ESP | Bhp | Watts | ESP | Bhp | Watts |
| 3250 | 0.32 | 1.41 | 1580 | 0.70 | 1.49 | 1670 | — | — | — | — | — | — | — | — | — | — | — | — |
| 3350 | 0.23 | 1.44 | 1610 | 0.63 | 1.52 | 1700 | 0.60 | 1.51 | 1690 | 0.82 | 1.62 | 1810 | — | — | — | — | — | — |
| 3450 | 0.17 | 1.46 | 1635 | 0.59 | 1.55 | 1730 | 0.55 | 1.54 | 1720 | 0.78 | 1.64 | 1840 | — | — | — | — | — | — |
| 3550 | 0.13 | 1.47 | 1645 | 0.56 | 1.56 | 1745 | 0.49 | 1.56 | 1750 | 0.73 | 1.67 | 1870 | — | — | — | — | — | — |
| 3650 | 0.09 | 1.49 | 1665 | 0.53 | 1.58 | 1765 | 0.43 | 1.59 | 1780 | 0.68 | 1.70 | 1900 | — | — | — | — | — | — |
| 3750 | — | — | — | 0.51 | 1.60 | 1790 | 0.39 | 1.62 | 1815 | 0.64 | 1.72 | 1930 | — | — | — | — | — | — |
| 3850 | — | — | — | 0.48 | 1.62 | 1810 | 0.33 | 1.64 | 1835 | 0.59 | 1.74 | 1950 | 0.60 | 1.85 | 2070 | 0.73 | 1.99 | 2230 |
| 3950 | — | — | — | 0.45 | 1.64 | 1835 | 0.27 | 1.66 | 1860 | 0.54 | 1.76 | 1975 | 0.56 | 1.87 | 2095 | 0.69 | 2.01 | 2255 |
| 4050 | — | — | — | 0.40 | 1.67 | 1865 | 0.22 | 1.68 | 1885 | 0.49 | 1.79 | 2000 | 0.51 | 1.89 | 2120 | 0.65 | 2.04 | 2280 |
| 4250 | — | — | — | — | — | — | 0.17 | 1.74 | 1945 | 0.40 | 1.84 | 2060 | 0.41 | 1.92 | 2145 | 0.56 | 2.06 | 2310 |
| 4450 | — | — | — | — | — | — | 0.00 | 1.79 | 2005 | 0.30 | 1.89 | 2115 | 0.31 | 1.97 | 2205 | 0.47 | 2.12 | 2370 |
| 4650 | — | — | — | — | — | — | — | — | — | 0.22 | 1.94 | 2170 | 0.20 | 2.04 | 2280 | 0.37 | 2.19 | 2450 |
| 4850 | — | — | — | — | — | — | — | — | — | 0.16 | 1.98 | 2215 | 0.11 | 2.09 | 2335 | 0.30 | 2.24 | 2505 |
| 5050 | — | — | — | — | — | — | — | — | — | 0.12 | 2.02 | 2260 | 0.04 | 2.13 | 2385 | 0.23 | 2.28 | 2555 |
| 5250 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.17 | 2.33 | 2610 |
| 5450 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.12 | 2.38 | 2665 |
| 5650 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.07 | 2.40 | 2690 |
| 5850 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.04 | 2.42 | 2710 |

LEGEND

**ESP** — External Static Pressure

## Table 24 — Operation Air Quantity Limits

| 48HG | COOLING | | GAS HEAT | HEATING |
|---|---|---|---|---|
| | Minimum CFM | Maximum CFM | | Minimum CFM |
| **014** | 3,750 | 6,250 | High Heat (6 cell) HGF<br>Low Heat (5 cell) HGD | 4,086<br>4,218 |
| **016** | 4,500 | 7,500 | High Heat (8 cell) HGF<br>Low Heat (5 cell) HGD | 5,522<br>4,218 |
| **020** | 5,400 | 9,000 | High Heat (8 cell) HGF<br>Low Heat (5 cell) HGD | 5,522<br>4,218 |
| **024** | 5,500 | 10,000 | High Heat (8 cell) HGF<br>Low Heat (5 cell) HGD | 5,522<br>4,218 |
| **028** | 7,500 | 11,500 | High Heat (8 cell) HDF<br>Low Heat (5 cell) HGD | 5,522<br>4,218 |

## Table 25 — Evaporator Fan Motor Specifications

| UNIT 48HG | OPTION | MOTOR P/N | NOMINAL HP | VOLTAGE | MAX WATTS | EFFICIENCY % | MAX BHP | MAX BkW | MAX AMPS |
|---|---|---|---|---|---|---|---|---|---|
| **014** | STD MOTOR | HD60FK651 | 3.7 | 208 | 3698 | 85.8 | 4.26 | 3.17 | 10.6 |
| | | HD60FK651 | 3.7 | 230 | 3698 | 85.8 | 4.26 | 3.17 | 9.6 |
| | | HD60FK651 | 3.7 | 460 | 3698 | 85.8 | 4.26 | 3.17 | 4.8 |
| | | HD58DL575 | 3.0 | 575 | 3149 | 81.7 | 3.45 | 2.57 | 3.9 |
| | ALT MOTOR | HD60FK653 | 5.0 | 208 | 4900 | 87.5 | 5.75 | 4.29 | 16.7 |
| | | HD60FK653 | 5.0 | 230 | 4900 | 87.5 | 5.75 | 4.29 | 15.2 |
| | | HD60FK653 | 5.0 | 460 | 4900 | 87.5 | 5.75 | 4.29 | 7.6 |
| | | HD60FK575 | 5.0 | 575 | 4900 | 87.5 | 5.75 | 4.29 | 6.1 |
| **016** | STD MOTOR | HD60FK651 | 3.7 | 208 | 3698 | 85.8 | 4.26 | 3.17 | 10.6 |
| | | HD60FK651 | 3.7 | 230 | 3698 | 85.8 | 4.26 | 3.17 | 9.6 |
| | | HD60FK651 | 3.7 | 460 | 3698 | 85.8 | 4.26 | 3.17 | 4.8 |
| | | HD58DL575 | 3.0 | 575 | 3149 | 81.7 | 3.45 | 2.57 | 3.9 |
| | ALT MOTOR | HD60FK653 | 5.0 | 208 | 4900 | 87.5 | 5.75 | 4.29 | 16.7 |
| | | HD60FK653 | 5.0 | 230 | 4900 | 87.5 | 5.75 | 4.29 | 15.2 |
| | | HD60FK653 | 5.0 | 460 | 4900 | 87.5 | 5.75 | 4.29 | 7.6 |
| | | HD60FK575 | 5.0 | 575 | 4900 | 87.5 | 5.75 | 4.29 | 6.1 |
| **020** | STD MOTOR | HD60FK653 | 5.0 | 208 | 4900 | 87.5 | 5.75 | 4.29 | 16.7 |
| | | HD60FK653 | 5.0 | 230 | 4900 | 87.5 | 5.75 | 4.29 | 15.2 |
| | | HD60FK653 | 5.0 | 460 | 4900 | 87.5 | 5.75 | 4.29 | 7.6 |
| | | HD60FK575 | 5.0 | 575 | 4900 | 87.5 | 5.75 | 4.29 | 6.1 |
| | ALT MOTOR | HD62FK652 | 7.5 | 208 | 7267 | 88.5 | 8.63 | 6.43 | 24.2 |
| | | HD62FK652 | 7.5 | 230 | 7267 | 88.5 | 8.63 | 6.43 | 22.0 |
| | | HD62FK652 | 7.5 | 460 | 7267 | 88.5 | 8.63 | 6.43 | 11.0 |
| | | HD62FK576 | 7.5 | 575 | 7267 | 88.5 | 8.63 | 6.43 | 9.0 |
| **024** | STD MOTOR | HD60FK653 | 5.0 | 208 | 4900 | 87.5 | 5.75 | 4.29 | 16.7 |
| | | HD60FK653 | 5.0 | 230 | 4900 | 87.5 | 5.75 | 4.29 | 15.2 |
| | | HD60FK653 | 5.0 | 460 | 4900 | 87.5 | 5.75 | 4.29 | 7.6 |
| | | HD60FK575 | 5.0 | 575 | 4900 | 87.5 | 5.75 | 4.29 | 6.1 |
| | ALT MOTOR | HD62FK652 | 7.5 | 208 | 7267 | 88.5 | 8.63 | 6.43 | 24.2 |
| | | HD62FK652 | 7.5 | 230 | 7267 | 88.5 | 8.63 | 6.43 | 22.0 |
| | | HD62FK652 | 7.5 | 460 | 7267 | 88.5 | 8.63 | 6.43 | 11.0 |
| | | HD62FK576 | 7.5 | 575 | 7267 | 88.5 | 8.63 | 6.43 | 9.0 |
| **028** | STD MOTOR | HD62FK652 | 7.5 | 208 | 7267 | 88.5 | 8.63 | 6.43 | 24.2 |
| | | HD62FK652 | 7.5 | 230 | 7267 | 88.5 | 8.63 | 6.43 | 22.0 |
| | | HD62FK652 | 7.5 | 460 | 7267 | 88.5 | 8.63 | 6.43 | 11.0 |
| | | HD62FK576 | 7.5 | 575 | 7267 | 88.5 | 8.63 | 6.43 | 9.0 |
| | ALT MOTOR | HD64FK651 | 10.0 | 208 | 9582 | 89.5 | 11.50 | 8.58 | 30.8 |
| | | HD64FK651 | 10.0 | 230 | 9582 | 89.5 | 11.50 | 8.58 | 28.0 |
| | | HD64FK651 | 10.0 | 460 | 9582 | 89.5 | 11.50 | 8.58 | 14.0 |
| | | HD64FK575 | 10.0 | 575 | 9582 | 89.5 | 11.50 | 8.58 | 11.0 |

LEGEND

**BkW —** Brake kilowatts

**Table 26 — Evaporator Fan Motor Specifications**

| MOTOR HP | MOTOR EFFICIENCY (%) |
|---|---|
| **3.0** | 81.7 |
| **3.7** | 85.8 |
| **5.0** | 87.5 |
| **7.5** | 88.5 |
| **10.0** | 89.5 |

**Table 27 — Fan RPM at Motor Pulley Settings**

| UNIT 48HG | | 0 | 0.5 | 1 | 1.5 | 2 | 2.5 | 3 | 3.5 | 4 | 4.5 | 5 | 5.5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **014 (208/230 and 460 v)** | Std. Motor/Std. Drive | 485 | 496 | 506 | 517 | 528 | 538 | 549 | 560 | 570 | 581 | 592 | 602 | 613 |
| | Std. Motor/Alt. Drive | 618 | 632 | 647 | 661 | 675 | 689 | 704 | 718 | 732 | 746 | 761 | 775 | 789 |
| | Alt. Motor/Std. Drive | 778 | 798 | 819 | 839 | 859 | 879 | 900 | 920 | 940 | 960 | 981 | 1001 | 1021 |
| | Alt. Motor/Opt. Drive | 1000 | 1019 | 1038 | 1057 | 1076 | 1095 | 1114 | 1132 | 1151 | 1170 | 1189 | 1208 | 1227 |
| **014 (575 v)** | Std. Motor/Std. Drive | 472 | 484 | 497 | 509 | 521 | 533 | 546 | 558 | 570 | 582 | 595 | 607 | 619 |
| | Std. Motor/Alt. Drive | 609 | 623 | 637 | 651 | 665 | 679 | 694 | 708 | 722 | 736 | 750 | 764 | 778 |
| | Alt. Motor/Std. Drive | 778 | 798 | 819 | 839 | 859 | 879 | 900 | 920 | 940 | 960 | 981 | 1001 | 1021 |
| | Alt. Motor/Opt. Drive | 1000 | 1019 | 1038 | 1057 | 1076 | 1095 | 1114 | 1132 | 1151 | 1170 | 1189 | 1208 | 1227 |
| **016 (208/230 and 460 v)** | Std. Motor/Std. Drive | 618 | 632 | 647 | 661 | 675 | 689 | 704 | 718 | 732 | 746 | 761 | 775 | 789 |
| | Std. Motor/Alt. Drive | 485 | 496 | 506 | 517 | 528 | 538 | 549 | 560 | 570 | 581 | 592 | 602 | 613 |
| | Alt. Motor/Std. Drive | 778 | 798 | 819 | 839 | 859 | 879 | 900 | 920 | 940 | 960 | 981 | 1001 | 1021 |
| | Alt. Motor/Opt. Drive | 1000 | 1019 | 1038 | 1057 | 1076 | 1095 | 1114 | 1132 | 1151 | 1170 | 1189 | 1208 | 1227 |
| **016 (575 v)** | Std. Motor/Std. Drive | 609 | 623 | 637 | 651 | 665 | 679 | 694 | 708 | 722 | 736 | 750 | 764 | 778 |
| | Std. Motor/Alt. Drive | 472 | 484 | 497 | 509 | 521 | 533 | 546 | 558 | 570 | 582 | 595 | 607 | 619 |
| | Alt. Motor/Std. Drive | 778 | 798 | 819 | 839 | 859 | 879 | 900 | 920 | 940 | 960 | 981 | 1001 | 1021 |
| | Alt. Motor/Opt. Drive | 1000 | 1019 | 1038 | 1057 | 1076 | 1095 | 1114 | 1132 | 1151 | 1170 | 1189 | 1208 | 1227 |
| **020, 024** | Std. Motor/Std. Drive | 658 | 671 | 683 | 696 | 708 | 721 | 733 | 746 | 758 | 771 | 783 | 796 | 808 |
| | Std. Motor/Alt. Drive | 794 | 809 | 824 | 839 | 854 | 869 | 884 | 899 | 914 | 929 | 944 | 959 | 974 |
| | Alt. Motor/Std. Drive | 949 | 965 | 982 | 998 | 1014 | 1031 | 1047 | 1063 | 1080 | 1096 | 1112 | 1129 | 1145 |
| | Alt. Motor/Opt. Drive | 1126 | 1143 | 1160 | 1177 | 1193 | 1210 | 1227 | 1244 | 1261 | 1278 | 1294 | 1311 | 1328 |
| **028** | Std. Motor/Std. Drive | 799 | 813 | 827 | 841 | 854 | 868 | 882 | 896 | 910 | 924 | 937 | 951 | 965 |
| | Std. Motor/Alt. Drive | 717 | 731 | 745 | 758 | 772 | 786 | 800 | 813 | 827 | 841 | 855 | 868 | 882 |
| | Alt. Motor/Std. Drive | 939 | 957 | 975 | 992 | 1010 | 1028 | 1046 | 1063 | 1081 | 1099 | 1117 | 1134 | 1152 |
| | Alt. Motor/Opt. Drive | 1152 | 1170 | 1188 | 1206 | 1223 | 1241 | 1259 | 1277 | 1295 | 1313 | 1330 | 1348 | 1366 |

## Base Unit Operation

HEATING

NOTE: The 48HG units have 2 stages of heat.

When the thermostat calls for heating, power is sent to W on the IGC (integrated gas unit controller) board. An LED (light-emitting diode) on the IGC board will be on during normal operation. A check is made to ensure that the rollout switch and limit switch are closed and the induced-draft motor is running. The induced-draft motor is then energized, and when speed is proven with the hall effect sensor on the motor, the ignition activation period begins. The burners will ignite within 5 seconds.

If the burners do not light, there is a 22-second delay before another 5-second attempt. If the burners still do not light, this sequence is repeated for 15 minutes. After the 15 minutes have elapsed, if the burners still have not lighted, heating is locked out. To reset the control, break 24-v power to the thermostat.

When ignition occurs the IGC board will continue to monitor the condition of the rollout and limit switches, the hall effect sensor, as well as the flame sensor. If the unit is controlled through a room thermostat set for fan auto., 45 seconds after ignition occurs, the indoor-fan motor will be energized (and the outdoor-air dampers will open to their minimum position). If for some reason the overtemperature limit opens prior to the start of the indoor fan blower, on the next attempt, the 45-second delay will be shortened to 5 seconds less than the time from initiation of heat to when the limit tripped. Gas will not be interrupted to the burners and heating will continue. Once modified, the fan on delay will not change back to 45 seconds unless power is reset to the control.

When additional heat is required, W2 closes and initiates power to the second stage of the main gas valve. When the thermostat is satisfied, W1 and W2 open and the gas valve closes, interrupting the flow of gas to the main burners. If the call for W1 lasted less than 1 minute, the heating cycle will not terminate until 1 minute after W1 became active. If the unit is controlled through a room thermostat set for fan auto., the indoor-fan motor will continue to operate for an additional 45 seconds then stop (and the outdoor-air dampers will close). If the overtemperature limit opens after the indoor motor is stopped within 10 minutes of W1 becoming inactive, on the next cycle the time will be extended by 15 seconds. The maximum delay is 3 minutes. Once modified, the fan off delay will not change back to 45 seconds unless power is reset to the control.

A LED indicator is provided on the IGC to monitor operation. The IGC is located by removing the heat section side panel. See Fig. 4. During normal operation, the LED is continuously on. See Table 28 for error codes.

For units with economizers, the outdoor-air damper stays at the Economizer Minimum Position while the evaporator fan is operating. The outdoor-air damper is closed when the indoor fan is not operating.

**Table 28 — IGC LED Indications**

| ERROR CODE | LED INDICATION |
|---|---|
| **Normal Operation** | On |
| **Hardware Failure** | Off |
| **Fan On/Off Delay Modified** | 1 Flash |
| **Limit Switch Fault** | 2 Flashes |
| **Flame Sense Fault** | 3 Flashes |
| **Five Consecutive Limit Switch Faults** | 4 Flashes |
| **Ignition Lockout Fault** | 5 Flashes |
| **Inducer Switch Fault** | 6 Flashes |
| **Rollout Switch Fault** | 7 Flashes |
| **Internal Control Fault** | 8 Flashes |
| **Software Lockout** | 9 Flashes |

LEGEND

**IGC** — Integrated Gas Unit Controller
**LED** — Light-Emitting Diode

NOTES:
1. There is a 3-second pause between error code displays.
2. If more than one error code exists, all applicable error codes will be displayed in numerical sequence.
3. Error codes on the IGC will be lost if power to the unit is interrupted.

## COOLING

Economizer Control — If the economizer is available for cooling, the unit will always try to meet demand using the economizer before turning on a compressor. The economizer is available for cooling when

- the outdoor temperature is below the Economizer Lockout Temp (EC.LO)
- the outdoor enthalpy is low.

If the economizer is not available for cooling, the economizer will try to maintain indoor quality instead of cooling. Indoor air quality is maintained by setting the economizer position to the Economizer Min Position (MIN.P).

If the economizer is available for cooling and yet it is unable to meet demand, the unit will continue to modulate the economizer while cycling the compressors to increase total cooling capacity.

If the indoor fan is not operating, the economizer will be closed.

Cooling Using Space Sensor (T55 or T56) Control — To operate the unit in Space Sensor mode, Unit Control Type must be set to Space Sensor (3) and a wire must be added between R and W1 on TB4 (see controls schematic). While in this mode, the unit tries to maintain the Space Temperature (SPT) at one of 4 different set points: the Occupied Cool Set Point — OCSP, the Unoccupied Cool Set Point — UCSP, the Occupied Heat Set Point — OHSP or the Unoccupied Heat Set Point — UHSP. The building's occupancy is affected by a number of different factors (see Controls and Troubleshooting Guide for details). When the building is occupied, the occupied set points are active. When the building in unoccupied, the unoccupied set points are active. Because Space Sensor mode is an "Auto" mode, the control will switch between cooling and heating to maintain temperature. However, to minimize unnecessary cool to heat and heat to cool changes, there is a 10-minute delay after the last stage turns off before the control will switch modes.

To maintain temperature while cooling, the unit will turn on compressors as needed when the economizer is either unavailable or not providing enough cooling. The minimum on-time for each compressor is 3 minutes and the minimum off-time is 5 minutes.

Because the unit contains 3 compressors, each with its own circuit, there are 3 stages of cooling (the economizer is not considered a stage of cooling even though it can provide cooling in certain situations). In general, the minimum time between increasing stages (from 1 to 2 and from 2 to 3) is 7.5 minutes, however, the minimum time between stages can be further reduced in certain situations (see Controls and Troubleshooting Guide). The minimum time between decreasing stages (3 to 1 and 2 to 0) is 5 minutes.

Cooling Using Thermostat Control — Thermostat cooling begins when the Y1 input is energized. If the economizer is available for cooling, the economizer will try to maintain the supply-air temperature (SAT) at either the Low Cool Supply Air Set Point (LCSASP) for a Y1 call or the High Cool Supply Air Set Point (HCSASP) for a Y2 call. If the economizer operates at 100% for 5 minutes or the economizer cooling is not available, the unit will begin to energize compressors. While the compressors are operating, the economizer will try to maintain its position at 100%. However, if low suction pressures are experienced, the economizer will begin to close in order to protect the compressors from damage.

Three different compressor-staging schemes are available with *Comfort*Link™ control. They are called Adaptive, 1-stage Y1 and 2-stage Y1. In Adaptive mode, once compressor staging begins (see above), at least one compressor will run as long as there is a Y1 call. On a three-circuit machine with only a Y1 call, the second circuit will cycle depending upon the trend in the supply-air temperature (SAT). If there is a Y1 call, compressors will stage up to the maximum number available.

The 1-stage Y1 and 2-stage Y1 modes are identical if there are only two circuits. In both cases, the stages follow the thermostat calls directly. The two modes differ when three circuits are available as they are on the 016, 020 and 024 units. In 1-stage Y1 mode, a Y1 call will cause the first compressor stage to operate immediately (there always is a 5-second delay between compressor starts) while in 2-stage Y1 mode, a Y1 call will cause the first two stages to operate immediately. For either mode, all stages will operate immediately if there a Y2 call.

If fan request G is energized, but Y1 is not energized, the indoor fan will operate and the economizer position will be maintained at MIN.P.

***Comfort*Link™ Display Usage —** The display module provides the user interface to the *Comfort*Link control system. See Fig. 23. The display has up and down arrow keys, an ESCAPE key, and an ENTER key. These keys are used to navigate through the different levels of the display structure. See Table 29. Press the ESCAPE key until the display is blank to move through the top 11 mode levels indicated by LEDs on the left side of the display.

Pressing the ESCAPE and ENTER keys simultaneously will scroll a clear language text description across the display indicating the full meaning of each display acronym. Pressing the ESCAPE and ENTER keys when the display is blank (Mode LED level) will return the display to its default menu of rotating display items. In addition, the password will be disabled requiring that it be entered again before changes can be made to password protected items.

When a specific item is located, the display will flash showing the operator, the item, followed by the item value and then followed by the item units (if any). Press the ENTER key to stop the display at the item value. Items in the Configuration and Service Test modes are password protected. The display will flash PASS and WORD when required. Use the ENTER and arrow keys to enter the 4 digits of the password. The default password is 1111.

Changing item values or testing outputs is accomplished in the same manner. Locate and display the desired item. Press ENTER to stop the display at the item value. Press the ENTER key again so that the item value flashes. Use the arrow keys to change the value or state of an item and press the ENTER key to accept it. Press the ESCAPE key and the item, value, or units display will resume. Repeat the process as required for other items.

**Clearing Unit Alarms —** The unit alarms can be cleared through the *Comfort*Link display. To check the current alarms, enter into the Alarms menu. The first submenu is the CURR submenu. The CURR function displays the list of current alarms (maximum of 25). The second submenu item is the R.CUR (Reset Current Alarms) function. Press ENTER to reset the current alarms. The next submenu item, HIST, displays the list of cleared alarms (maximum of 20) HIST function can be cleared with the R.HIS function.

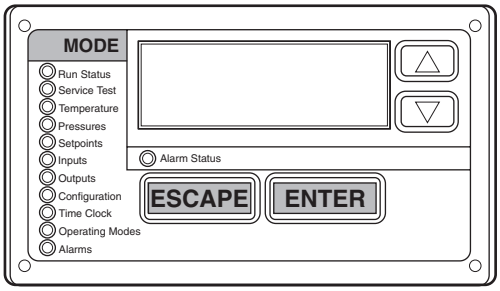



**Fig. 23 — Scrolling *Comfort*Link Display**

**Table 29 — *Comfort*Link Display Menu Structure**

| RUN STATUS | SERVICE TEST | TEMPERATURES | PRESSURES | SET POINTS | INPUTS | OUTPUTS | CONFIGURATION | TIME CLOCK | OPERATING MODES | ALARMS |
|---|---|---|---|---|---|---|---|---|---|---|
| Auto Display (VIEW) | Manual Mode On/Off (TEST) | Unit Temperatures (UNIT) | Ckt A Pressures (CIR.A) | Cooling (COOL) | Thermostat Inputs (STAT) | Fans (FANS) | Unit (UNIT) | Time (TIME) | Unit (SYS) | Current Alarms (CURR) |
| Software Version (VERS) | Unit Output Test (OUTS) | Ckt A Temperatures (CIR.A) | Ckt B Pressures (CIR.B) | Heating (HEAT) | Switch Inputs (SWIN) | Compressor (CMPR) | Cool (COOL) | Date (DATE) | Mode (HVAC) | Reset Current Alarms (R.CUR) |
| Run Hours (HRS) | Compressors Test (COMP) | Ckt B Temperatures (CIR.B) | Ckt C Pressures (CIR.C) | | Compressor Current Sense (CSIN) | Heat (HEAT) | Heat (HEAT) | Schedule No. (SCHN) | | Alarm History (HIST) |
| Component Cycles (CYCS) | | Ckt C Temperatures (CIR.C) | | | | Economizer (ECON) | Economizer (ECON) | Local Schedule (SCHL) | | Reset Alarm History (R.HIS) |
| Compressor TimeGuard (TMGD) | | | | | | Miscellaneous (MISC) | Indoor Air Quality (IAQ) | | | |
| | | | | | | | Carrier Comfort Network (CCN) | | | |
| | | | | | | | Display (DISP) | | | |

## SERVICE

**⚠ WARNING**

Before performing service or maintenance operations on unit, turn off main power switch to unit. Electrical shock could cause personal injury.

**Cleaning —** Inspect unit interior at beginning of each heating and cooling season and as operating conditions require. Remove unit top panel and/or side panels for access to unit interior.

EVAPORATOR COIL — Clean as required with commercial coil cleaner.

CONDENSER COIL — Clean condenser coil annually and as required by location and outdoor-air conditions. Inspect coil monthly; clean as required.

CONDENSATE DRAIN — Check and clean each year at the start of the cooling season. In winter, keep drains and traps dry. An access panel is located above the condensate connection to allow easy clean out of the condensate pan. The first time the panel is removed, the insulation behind the access panel will need to be cut away. Carefully cut the insulation with a knife or blade on three sides so the insulation can be folded out of the way during cleaning. Be careful not to damage components behind the insulation while cutting. Once cleaning is completed, fold the insulation back into place and secure the access panel in the original position.

FILTERS — Clean or replace at start of each heating and cooling season, or more often if operating conditions require. Refer to Table 1 for type and size.

OUTDOOR-AIR INLET SCREENS — Clean screens with steam or hot water and a mild detergent. Do not use throwaway filters in place of screens. See Table 1 for quantity and size.

MAIN BURNER — At the beginning of each heating season, inspect for deterioration or blockage due to corrosion or other causes. Observe the main burner flames. Refer to Main Burners section on page 43.

FLUE GAS PASSAGEWAYS — The flue collector box and heat exchanger cells may be inspected by removing heat section access panel (Fig. 4), flue box cover, and main burner assembly (Fig. 24). Refer to Main Burners section on page 43 for burner removal sequence. If cleaning is required, clean tubes with a wire brush.

Use caution with ceramic heat exchanger baffles. When installing retaining clip, be sure the center leg of the clip extends inward toward baffle. See Fig. 25.

COMBUSTION-AIR BLOWER — Clean periodically to assure proper airflow and heating efficiency. Inspect blower wheel every fall and periodically during heating season. For the first heating season, inspect blower wheel bi-monthly to determine proper cleaning frequency.

To inspect blower wheel, remove heat section panel. Using an inspection mirror and flashlight, look into the flue exhaust duct to inspect the wheel. If cleaning is required, remove motor and wheel assembly by removing the screws holding the flue box cover to the flue box. See Fig. 24. Remove the screws holding the inducer housing to the inlet plate. The wheel can then be removed from the motor shaft and cleaned with a detergent or solvent. Replace the wheel onto the motor shaft in the correct position and reassemble the flue cover onto the flue box.

### Lubrication

COMPRESSORS — Each compressor is charged with the correct amount of oil at the factory. Conventional white oil (Zerol 150T or Sontex SA32) is used. White oil is compatible

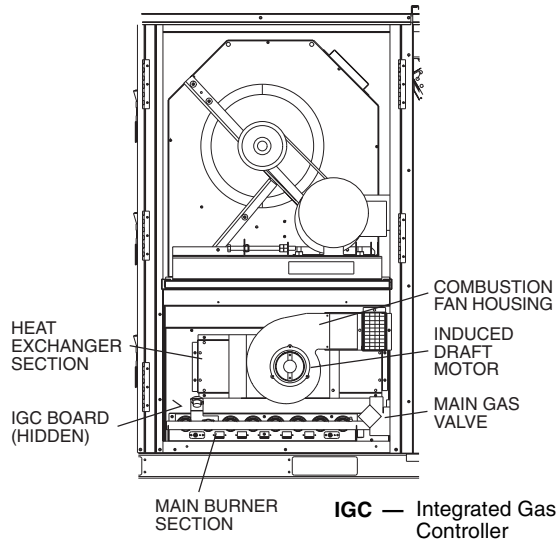
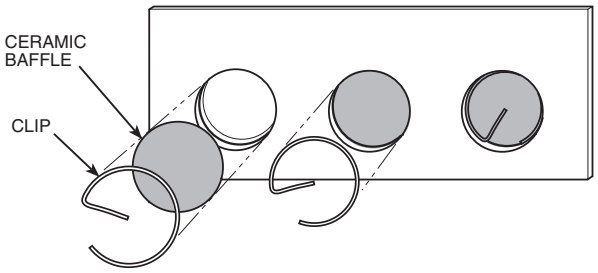



**Fig. 24 — Typical Gas Heating Section**




NOTE: One baffle and clip will be in each upper tube of the heat exchanger.

**Fig. 25 — Removing Heat Exchanger Ceramic Baffles and Clips**

with 3GS oil, and 3GS oil may be used if the addition of oil is required. See compressor nameplate for original oil charge. Oil recharge amount is shown in Table 1. When a compressor is exchanged in the field it is possible that a major portion of the oil from the replaced compressor may still be in the system. While this will not affect the reliability of the replacement compressor, the extra oil will add rotor drag and increase power usage. To remove this excess oil, an access valve may be added to the lower portion of the suction line at the inlet of the compressor. The compressor should then be run for 10 minutes, shut down and the access valve opened until no oil flows. This should be repeated twice to make sure the proper oil level has been achieved.

FAN SHAFT BEARINGS — Lubricate bearings at least every 6 months with suitable bearing grease. Typical lubricants are given below:

| MANUFACTURER | LUBRICANT |
|---|---|
| **Texaco** | Regal AFB-2* |
| **Mobil** | Mobilplex EP No. 1 |
| **Sunoco** | Prestige 42 |
| **Texaco** | Multifak 2 |

*Preferred lubricant because it contains rust and oxidation inhibitors.

CONDENSER AND EVAPORATOR-FAN MOTOR BEARINGS — The condenser- and evaporator-fan motors have permanently-sealed bearings, so no field lubrication is necessary.

**Evaporator Fan Service and Replacement —** The 48HG units feature a slide-out fan deck for easy servicing of the indoor-fan motor, pulleys, belt, and bearings. To service components in this section, perform the following procedure:

1. Open the fan section access panel.
2. Remove three no. 10 screws at front of slide-out fan deck. Save screws. See Fig. 26.
3. Disconnect the electrical plugs connected to the slide-out fan deck (fan plug, supply air thermistor, and limit switch). Wires may be damaged if not disconnected.
4. Fan deck can now be slid out to access serviceable components.

**⚠ CAUTION**

DO NOT SLIDE FAN DECK OUT PAST CLOSEST FAN SIDE PLATE. If further access is required, the fan deck must be supported. Make sure plugs and wiring are not pinched between fan housing and unit center post. Damage to unit may result.

5. To replace fan deck to operating position, slide fan deck back into the unit. Secure with the three no. 10 screws removed in Step 2.
6. Re-attach electrical plugs.
7. Close fan section access door.

**Evaporator Fan Performance Adjustment (Fig. 26 and 27) —** Fan motor pulleys are factory set for speed shown in Table 1.

To change fan speeds:

1. Shut off unit power supply.
2. Loosen nuts on the 4 carriage bolts in the mounting base. Using adjusting bolts and plate, slide motor and remove belt.
3. Loosen movable-pulley flange setscrew (see Fig. 27).
4. Screw movable flange toward fixed flange to increase speed and away from fixed flange to decrease speed. Increasing fan speed increases load on motor. Do not exceed maximum speed specified in Table 1.

   See Table 23 for air quantity limits.
5. Set movable flange at nearest keyway of pulley hub and tighten setscrew. (See Table 1 for speed change for each full turn of pulley flange.)
6. Replace and tighten belts (see Belt Tension Adjustment section below).

To align fan and motor pulleys:

1. Loosen fan pulley setscrews.
2. Slide fan pulley along fan shaft.
3. Make angular alignment by loosening motor from mounting plate.

**Belt Tension Adjustment —** To adjust belt tension:

1. Slide out fan deck to service position as shown in Evaporator Fan Service and Replacement section above.
2. Loosen fan motor bolts.
3. Move motor mounting plate to adjust to proper belt tension. Motor adjuster bolts may be used to tighten belts. See Fig. 26.
4. Check for proper belt alignment. Adjust if necessary.
5. Tighten motor mounting plate bolts to lock motor in proper position.
6. Return fan deck back into operating position.

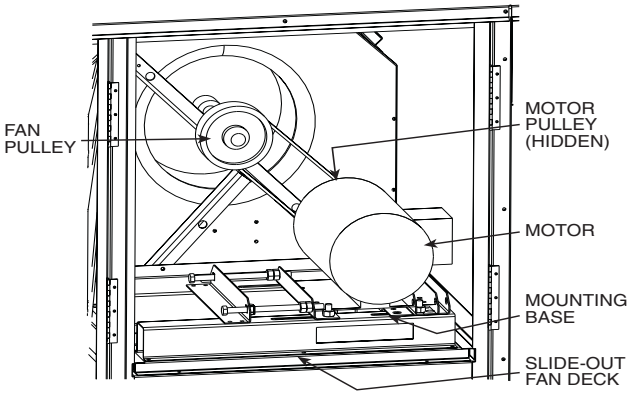



**Fig. 26 — Evaporator-Fan Motor Adjustment**

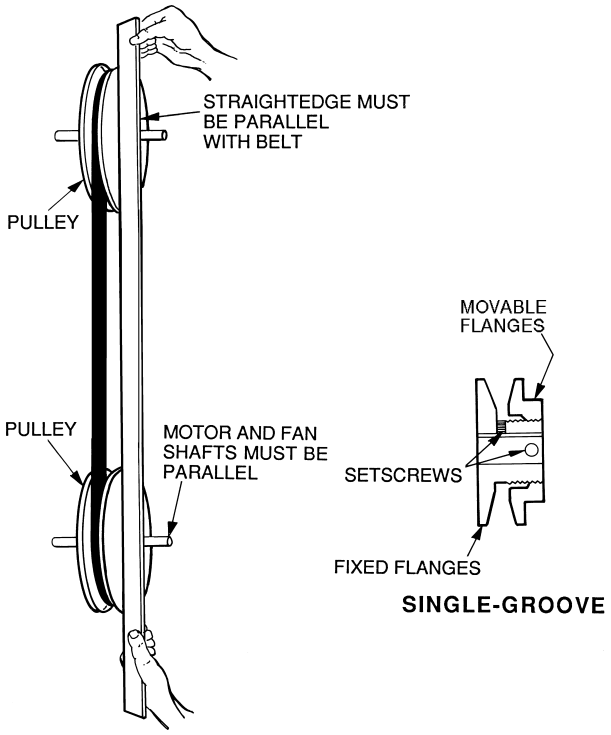



**Fig. 27 — Evaporator-Fan Alignment and Adjustment**

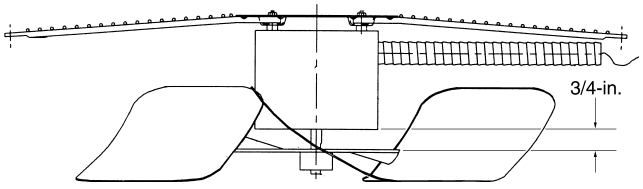



**Fig. 28 — Condenser-Fan Adjustment**

**Condenser-Fan Adjustment (Fig. 28)**

1. Shut off unit power supply.
2. Remove condenser-fan assembly (grille, motor, motor cover, and fan) and loosen fan hub setscrews.
3. Adjust fan height as shown in Fig. 28.
4. Tighten setscrews and replace condenser-fan assembly.

**Economizer Checkout Procedure —** For units equipped with economizers, the unit software provides a test to determine if the economizer is working properly. The following steps specify how to test the economizer using the *Comfort*Link™ display). Refer to *Comfort*Link Display Usage section on page 40 for more information.

1. Enter the Service Test main menu on the display.
2. Enter the TEST submenu and turn ON test mode. If the password has not already been entered, the password must be entered in order to turn ON Service Test. The default password is 1111.
3. Return to the main level of Service Test.
4. Enter the OUTS submenu and turn on the IDF (indoor fan).
5. Return to the OUTS submenu and enter an initial value for ECON. This will drive the economizer damper to the specified position. Continue to adjust the ECON value to make sure the economizer opens and closes.
6. Return to the TEST submenu and turn OFF test mode. This will cause the economizer to close and the indoor fan to turn off. Verify that the economizer damper moves as directed.

**Verify Outdoor Air Temperature (OAT) Sensor and Supply Air Temperature (SAT) Sensor Performance —** Verify that the OAT and SAT sensors are reading correctly. The OAT and SAT values can be accessed through the *Comfort*Link™ display in the Temperatures menu and UNIT submenu.

**Power Failure —** Dampers have a spring return. In event of power failure, dampers will return to fully closed position until power is restored. *Do not manually operate damper motor.*

**Refrigerant Charge —** Amount of refrigerant charge is listed on unit nameplate and in Table 1. Refer to Carrier GTAC II; Module 5; Charging, Recovery, Recycling, and Reclamation section for charging methods and procedures. Unit panels must be in place when unit is operating during charging procedure.

NOTE: Do not use recycled refrigerant as it may contain contaminants.

NO CHARGE — Use standard evacuating techniques. After evacuating system, weigh in the specified amount of refrigerant (refer to Table 1).

LOW CHARGE COOLING — Using cooling charging chart (see Fig. 29-33), add or remove refrigerant until conditions of the chart are met. An accurate pressure gage and temperature-sensing device is required. Charging is accomplished by ensuring the proper amount of liquid subcooling. Measure liquid line pressure at the liquid line service valve using pressure gage. Connect temperature sensing device to the liquid line near the liquid line service valve and insulate it so that outdoor ambient temperature does not affect reading.

TO USE THE COOLING CHARGING CHART — Use the above temperature and pressure readings, and find the intersection point on the cooling charging chart. If intersection point on chart is above line, add refrigerant. If intersection point on chart is below line, carefully recover some of the charge. Recheck suction pressure as charge is adjusted.

NOTE: Indoor-air CFM must be within normal operating range of unit. All outdoor fans must be operating.

The TXV (thermostatic expansion valve) is set to maintain between 10 and 15 degrees of superheat at the compressors. The valves are factory set and should not require re-adjustment.

## Gas Valve Adjustment

NATURAL GAS — The gas valve opens and closes in response to the thermostat or limit control.

When power is supplied to valve terminals W2 (High Fire) and C1, the main valve opens to its preset position.

The regular factory setting is stamped on the valve body (2.95 in. wg).

To adjust regulator:

1. Set unit at setting for no call for heat.
2. Turn main gas valve to OFF position.
3. Remove $^1/_8$-in. pipe plug from manifold or gas valve pressure tap connection. Install a suitable pressure-measuring device.
4. Set main gas valve to ON position.
5. Set thermostat at setting to call for heat.
6. Remove screw cap covering regulator adjustment screw (See Fig. 34).
7. Turn adjustment screw clockwise to increase pressure or counterclockwise to decrease pressure.
8. Once desired pressure is established, set unit setting for no call for heat, turn off main gas valve, remove pressure-measuring device, and replace $^1/_8$-in. pipe plug and screw cap.

**Main Burners —** For all applications, main burners are factory set and should require no adjustment.

MAIN BURNER REMOVAL

1. Shut off (field-supplied) manual main gas valve.
2. Shut off power to unit.
3. Remove gas section access panel.
4. Disconnect gas piping from gas valve inlet.
5. Remove wires from gas valve.
6. Remove wires from rollout switch.
7. Remove sensor wire and ignitor cable from IGC board.
8. Remove 2 screws securing manifold bracket to basepan.
9. Remove 2 screws that hold the burner assembly to vestibule plate.
10. Lift burner/manifold assembly out of unit.

CLEANING AND ADJUSTMENT

1. Remove burner rack from unit as described in Main Burner Removal section above.
2. Inspect burners, and if dirty, remove burners from rack.
3. Using a soft brush, clean burners and crossover port as required.
4. Adjust spark gap. See Fig. 35.
5. Reinstall burners on rack.
6. Reinstall burner rack as described above.

**Filter Drier —** Replace whenever refrigerant system is exposed to atmosphere.

## Protective Devices

COMPRESSOR PROTECTION

Overcurrent — Each compressor has internal line break motor protection.

Overtemperature — Each compressor has an internal protector to protect it against excessively high discharge gas temperatures.

High-Pressure Switch — If the high-pressure switch trips, the compressor will shut down and the current sensor will not detect current. See the Current Sensor section below for more information.

Current Sensor (CS) — The purpose of the CS is to detect losses in compressor power. After detecting a loss in compressor power, unit control locks out the compressor for 15 minutes. After 15 minutes, the alarm will automatically reset. If this alarm occurs 3 times consecutively, the compressor will remain locked out until an alarm reset is initiated via CCN or manually via the *Comfort*Link display (see Clearing Unit Alarms section on page 40 for more details).

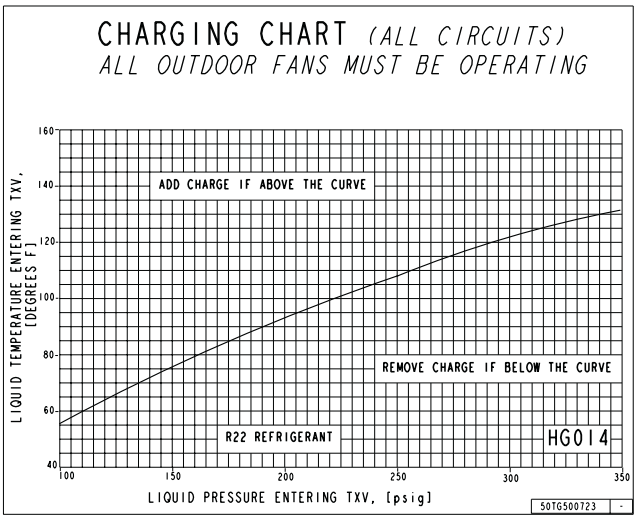

CHARGING CHART (ALL CIRCUITS)
ALL OUTDOOR FANS MUST BE OPERATING
LIQUID TEMPERATURE ENTERING TXV, [DEGREES F]
ADD CHARGE IF ABOVE THE CURVE
REMOVE CHARGE IF BELOW THE CURVE
R22 REFRIGERANT
HG014
LIQUID PRESSURE ENTERING TXV, [psig]
50TG500723

**Fig. 29 — Cooling Charging Chart — 48HG014 Units**

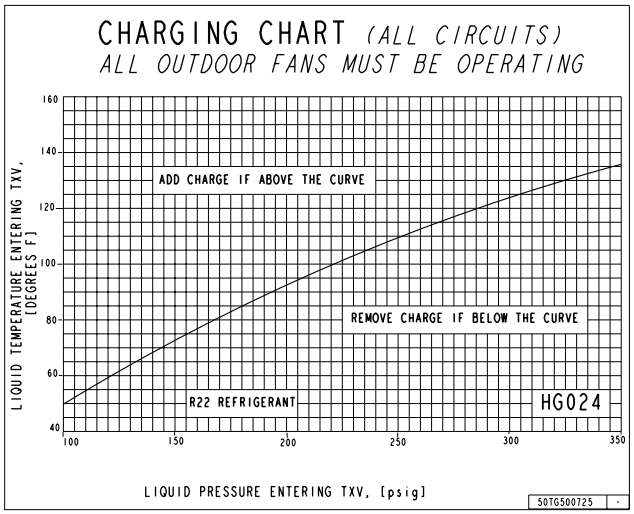

CHARGING CHART (ALL CIRCUITS)
ALL OUTDOOR FANS MUST BE OPERATING
LIQUID TEMPERATURE ENTERING TXV, [DEGREES F]
ADD CHARGE IF ABOVE THE CURVE
REMOVE CHARGE IF BELOW THE CURVE
R22 REFRIGERANT
HG024
LIQUID PRESSURE ENTERING TXV, [psig]
50TG500725

**Fig. 32 — Cooling Charging Chart — 48HG024 Units**

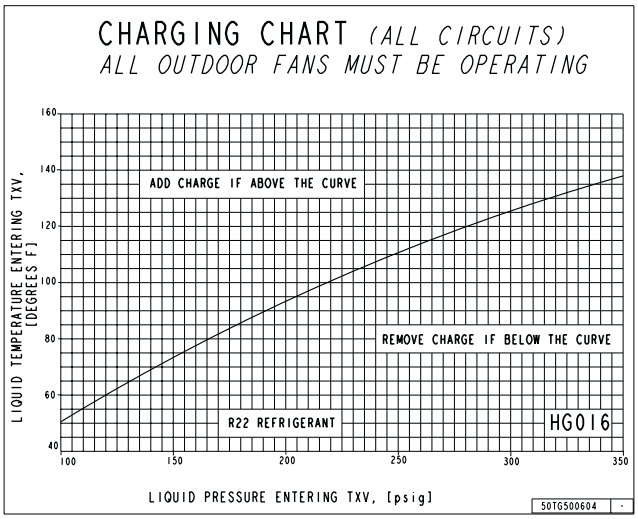

CHARGING CHART (ALL CIRCUITS)
ALL OUTDOOR FANS MUST BE OPERATING
LIQUID TEMPERATURE ENTERING TXV, [DEGREES F]
ADD CHARGE IF ABOVE THE CURVE
REMOVE CHARGE IF BELOW THE CURVE
R22 REFRIGERANT
HG016
LIQUID PRESSURE ENTERING TXV, [psig]
50TG500604

**Fig. 30 — Cooling Charging Chart — 48HG016 Units**

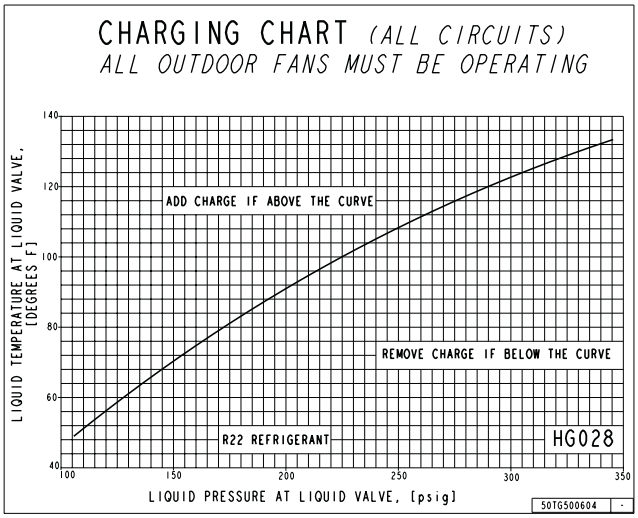

CHARGING CHART (ALL CIRCUITS)
ALL OUTDOOR FANS MUST BE OPERATING
LIQUID TEMPERATURE AT LIQUID VALVE, [DEGREES F]
ADD CHARGE IF ABOVE THE CURVE
REMOVE CHARGE IF BELOW THE CURVE
R22 REFRIGERANT
HG028
LIQUID PRESSURE AT LIQUID VALVE, [psig]
50TG500604

**Fig. 33 — Cooling Charging Chart — 48HG028 Units**

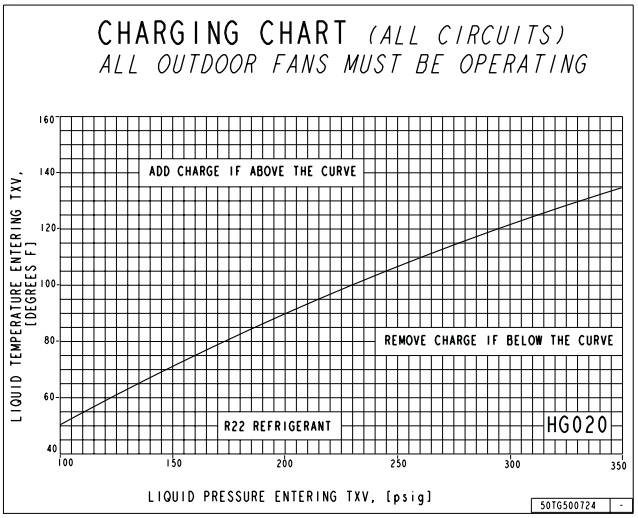

CHARGING CHART (ALL CIRCUITS)
ALL OUTDOOR FANS MUST BE OPERATING
LIQUID TEMPERATURE ENTERING TXV, [DEGREES F]
ADD CHARGE IF ABOVE THE CURVE
REMOVE CHARGE IF BELOW THE CURVE
R22 REFRIGERANT
HG020
LIQUID PRESSURE ENTERING TXV, [psig]
50TG500724

**Fig. 31 — Cooling Charging Chart — 48HG020 Units**

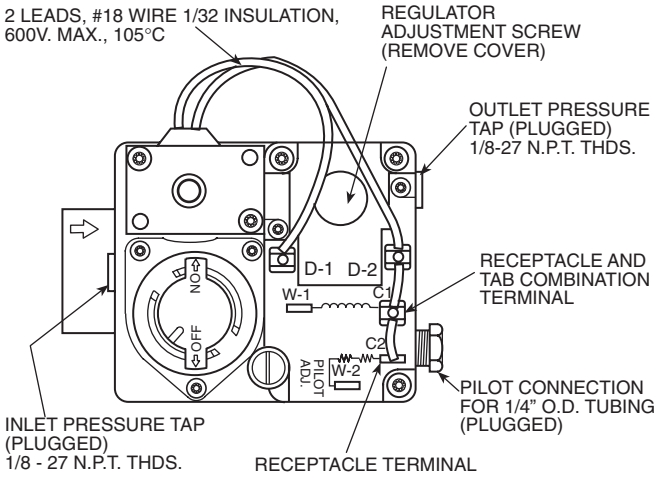



**Fig. 34 — Gas Valve**

EVAPORATOR FAN MOTOR PROTECTION — A manual reset, calibrated trip, magnetic circuit breaker protects against overcurrent. Do not bypass connections or increase the size of the breaker to correct trouble. Determine the cause and correct it before resetting the breaker.

CONDENSER-FAN MOTOR PROTECTION — Each condenser-fan motor is internally protected against overtemperature.

SATURATED SUCTION PRESSURE (SSP) — If the SSP for a particular circuit is reading below the alarm set point for an extended period of time, that circuit will be shut down. After 15 minutes, the alarm will automatically reset. If this alarm occurs 3 times consecutively, the circuit will remain locked out until an alarm reset is initiated via CCN or manually via the *Comfort*Link™ display (see Clearing Unit Alarms section on page 40 for more details).

**Relief Devices —** All units have relief devices to protect against damage from excessive pressures (i.e., fire). These devices protect the high and low side.

**Control Circuit, 24-V —** Each control circuit is protected against overcurrent by a 3.2 amp circuit breaker. Breaker can be reset. If it trips, determine cause of trouble before resetting.

**Replacement Parts —** A complete list of replacement parts may be obtained from any Carrier distributor upon request.

**Diagnostic LEDs —** The IGC control board has a LED for diagnostic purposes. The IGC error codes are shown in Table 27.

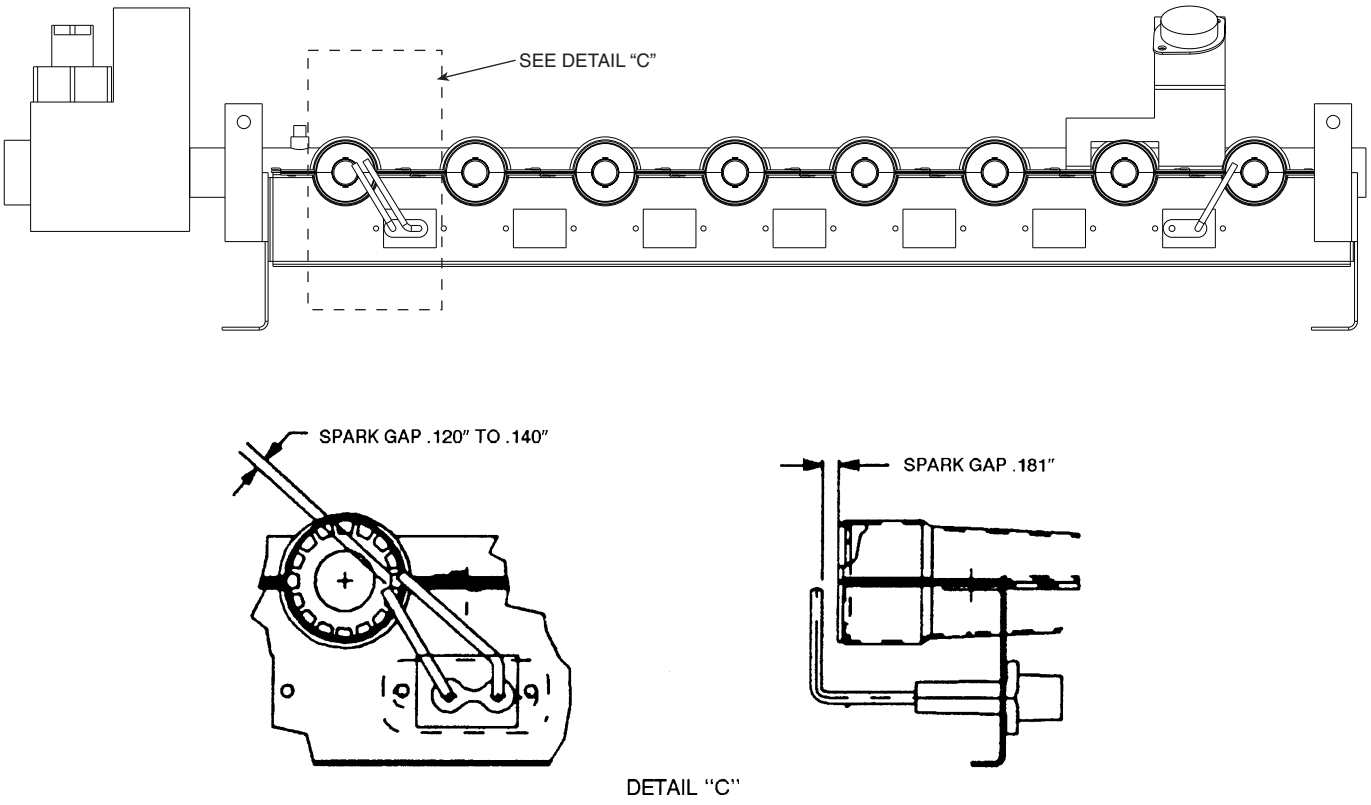
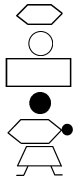



**Fig. 35 — Spark Gap Adjustment**

## LEGEND

### Fig. 36 — Low Voltage Control Schematic
### Fig. 37 — Power Schematic and Fig. 38 — Component Arrangement

**_ _ .A** — Circuit A
**AUX** — Auxiliary Contact
**_ _ .B** — Circuit B
**_ _ .C** — Circuit C
**C** — Compressor, Contactor
**CAP** — Capacitor
**CB** — Circuit Breaker
**CCN** — Carrier Comfort Network
**CCH** — Crankcase Heater
**COMP** — Compressor
**CS** — Current Sensor
**DU** — Dummy Terminal
**EC** — Enthalpy Control
**ECB** — Economizer Control Board
**FIOP** — Factory-Installed Option
**FS** — Flame Sensor
**FU** — Fuse
**GND** — Ground
**GV** — Gas Valve
**HPS** — High Pressure Switch
**I** — Ignitor
**IAQ** — Indoor-Air Quality
**IDM** — Induced-Draft Motor
**IFC** — Indoor Fan Contactor
**IFCB** — Indoor Fan Circuit Breaker
**IFM** — Indoor Fan Motor
**IGC** — Integrated Gas Controller
**LEN** — Local Equipment Network
**LS** — Limit Switch
**MBB** — Main Base Board
**OAQ** — Outdoor-Air Quality
**OAT** — Outdoor-Air Temperature
**OFC** — Outdoor Fan Contactor
**OFM** — Outdoor Fan Motor
**PEC** — Power Exhaust Contactor
**PEM** — Power Exhaust Motor
**PL** — Plug
**QT** — Quadruple Terminal
**RS** — Rollout Switch
**SAT** — Supply-Air Temperature
**SCT** — Saturated Condensing Temp
**SSP** — Saturated Suction Pressure
**TB** — Terminal Block
**TRAN** — Transformer
**T-55** — Room Temp Sensor
**T-56** — Set Point Adjustment and Room Temp Sensor



Terminal (Marked)
Terminal (Unmarked)
Terminal Block
Splice
Splice (Marked)
Splice (Field Supplied)
Factory Wiring
Field Control Wiring
Field Power Wiring
Accessory or Optional Wiring
To Indicate Common Potential Only, Not To Represent Wiring

THERMOSTAT/IGC MARKINGS

**BM** — Blower Motor
**C** — Common
**CM** — Inducer Motor
**CS** — Centrifugal Switch
**G** — Fan
**IFO** — Indoor Fan On
**LI** — Line I
**R** — Thermostat Power
**RT** — Power Supply
**SS** — Speed Sensor
**W** — Thermostat Heat
**W1** — 1st Stage of Heating
**W2** — 2nd Stage of Heating
**X** — Alarm Output
**Y1** — 1st Stage of Cooling
**Y2** — 2nd Stage of Cooling

NOTES:
1. Factory wiring is in accordance with the National Electrical Codes. Any field modifications or additions must be in compliance with all applicable codes.
2. Use 75° C minimum wire for field power supply. Use copper wires for all units.
3. All circuit breakers “Must Trip Amps” are equal to or less than 156% RLA.
4. Compressor and fan motors are thermally protected. Three-phase motors protected against primary single phase conditions.
5. Red jumper wire must be added between R and W1 for space temperature mode and temporarily during service-test mode when the heaters need to operate.

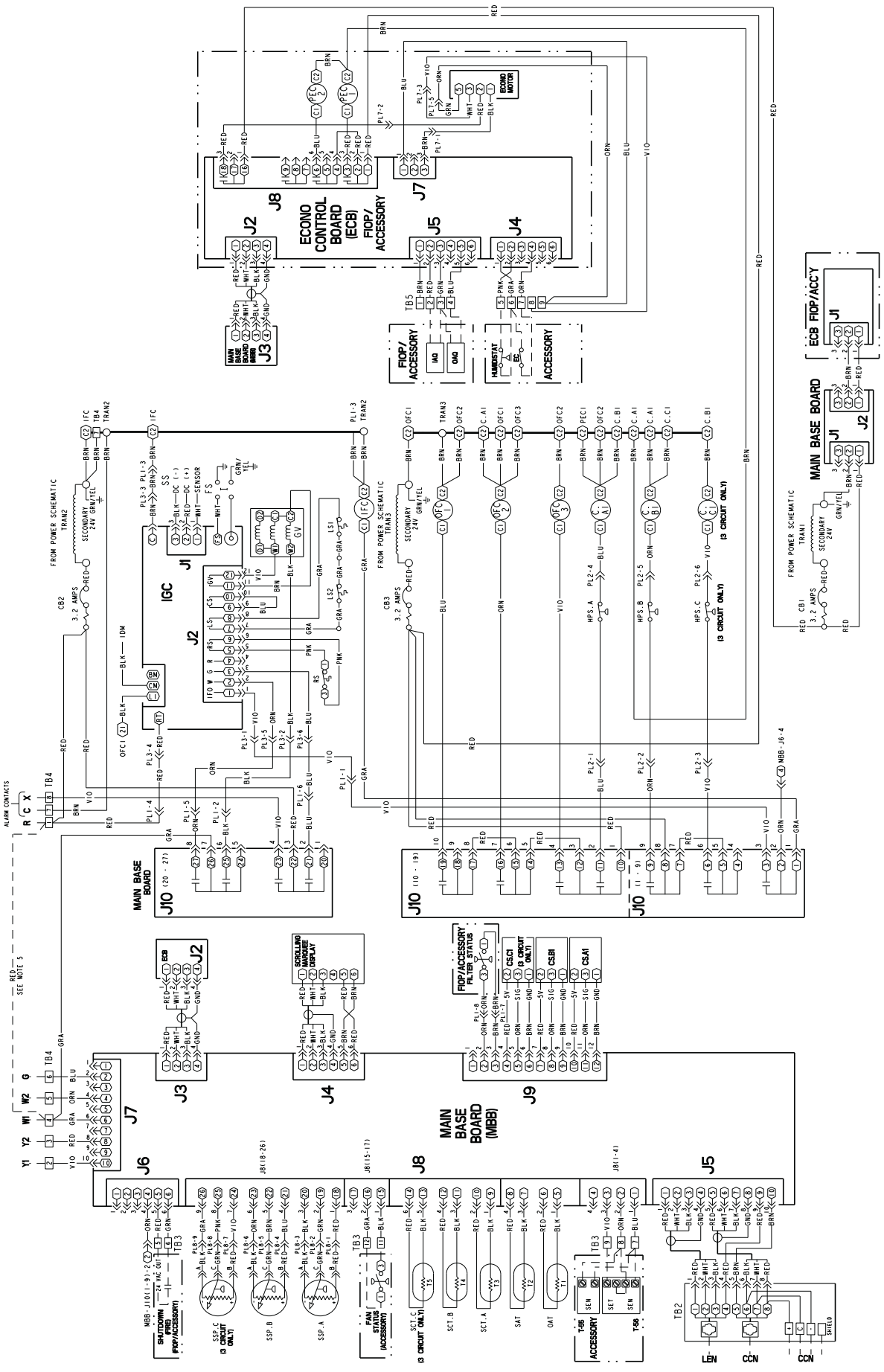



**Fig. 36 — Low Voltage Control Schematic**

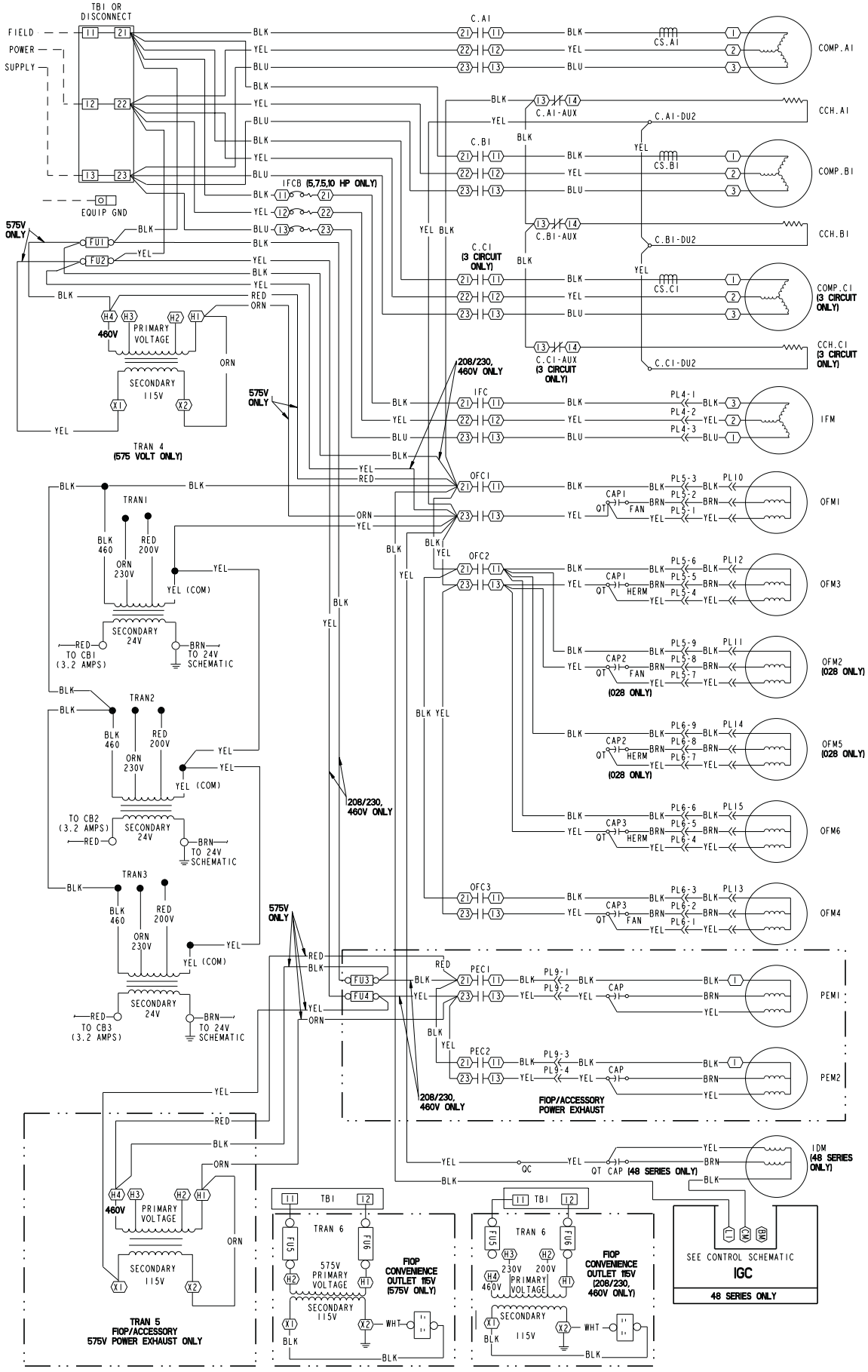
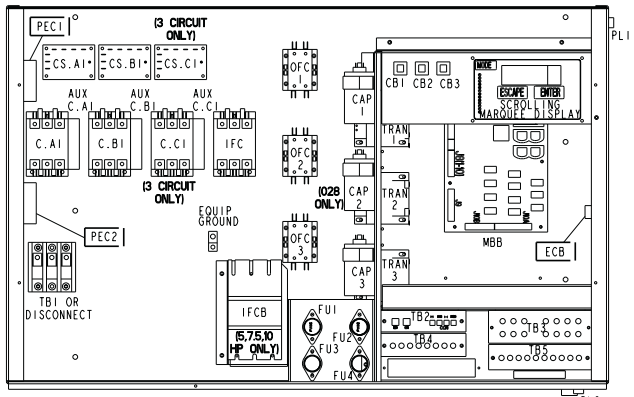
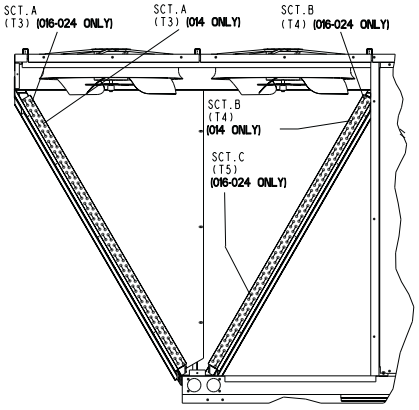



**Fig. 37 — Power Schematic**

## COMPONENT ARRANGEMENT



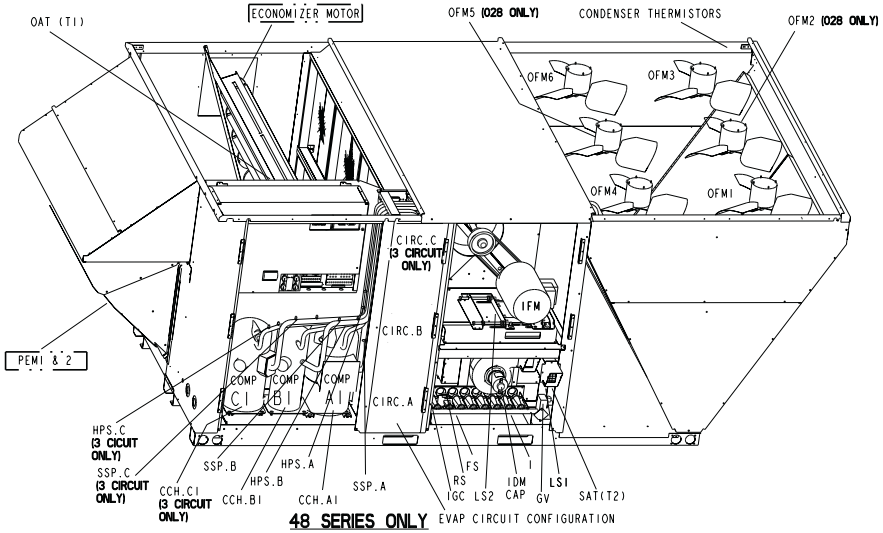

CONTROL BOX




CONDENSER COIL

THERMISTOR LOCATIONS (HAIRPIN END)

| PLUG LOCATION REFERENCE | |
|---|---|
| PL1 | CONTROL BOX-TOP RIGHT (HEAT CONTROLS) |
| PL2 | CONTROL BOX-BOTTOM (HPS. A, B, C) |
| PL3 | HEAT SECTION PARTITION (HEAT CONTROLS) |
| PL4 | FAN SECTION (INDOOR FAN MOTOR) |
| PL5 | CONDENSER SECTION (OFM1, 2, 3) |
| PL6 | CONDENSER SECTION (OFM4, 5, 6) |
| PL7 | ECONOMIZER SECTION (ECONOMIZER MOTOR) |
| PL8 | CONTROL BOX-BOTTOM (TRANSDUCERS SSP. A,B,C) |
| PL9 | POWER EXHAUST SECTION (POWER EXHAUST MOTORS) |
| PL10 | CONDENSER SECTION (OFM1) |
| PL11 | CONDENSER SECTION (OFM2) |
| PL12 | CONDENSER SECTION (OFM3) |
| PL13 | CONDENSER SECTION (OFM4) |
| PL14 | CONDENSER SECTION (OFM5) |
| PL15 | CONDENSER SECTION (OFM6) |




48 SERIES ONLY EVAP CIRCUIT CONFIGURATION

**Fig. 38 — Component Arrangement**

## TROUBLESHOOTING

Refer to Tables 30 and 31 for troubleshooting details.

### Table 30 — Cooling Service Analysis

| PROBLEM | CAUSE | REMEDY |
|---|---|---|
| **Compressor and condenser fan will not start.** | Power failure. | Call power company. |
| | Fuse blown or circuit breaker tripped. | Replace fuse or reset circuit breaker. |
| | Defective thermostat, contactor, transformer, or control relay. | Replace component. |
| | Insufficient line voltage. | Determine cause and correct. |
| | Incorrect or faulty wiring. | Check wiring diagram and rewire correctly. |
| | Thermostat setting too high. | Lower thermostat setting below room temperature. |
| **Compressor will not start but condenser fan runs.** | Faulty wiring or loose connections in compressor circuit. | Check wiring and repair or replace. |
| | Compressor motor burned out, seized, or internal overload open. | Determine cause. Replace compressor. |
| | Defective overload. | Determine cause and replace. |
| | Compressor locked out | Determine cause for safety trip and reset lockout. |
| | One leg of 3-phase power dead. | Replace fuse or reset circuit breaker. Determine cause. |
| **Compressor cycles (other than normally satisfying thermostat).** | Refrigerant overcharge or undercharge. | Recover refrigerant, evacuate system, and recharge to nameplate. |
| | Defective compressor. | Replace and determine cause. |
| | Insufficient line voltage. | Determine cause and correct. |
| | Blocked condenser. | Determine cause and correct. |
| | Defective overload. | Determine cause and replace. |
| | Defective thermostat. | Replace thermostat. |
| | Faulty condenser-fan motor. | Replace. |
| | Restriction in refrigerant system. | Locate restriction and remove. |
| **Compressor operates continuously.** | Dirty air filter. | Replace filter. |
| | Unit undersized for load. | Decrease load or increase unit size. |
| | Thermostat set too low. | Reset thermostat. |
| | Low refrigerant charge. | Locate leak, repair, and recharge. |
| | Air in system. | Recover refrigerant, evacuate system, and recharge. |
| | Condenser coil dirty or restricted. | Clean coil or remove restriction. |
| **Excessive head pressure.** | Dirty air filter. | Replace filter. |
| | Dirty condenser coil. | Clean coil. |
| | Refrigerant overcharged. | Recover excess refrigerant. |
| | Faulty TXV. | 1. Check TXV bulb mounting and secure tightly to suction line.<br>2. Replace TXV if stuck open or closed. |
| | Air in system. | Recover refrigerant, evacuate system, and recharge. |
| | Condenser air restricted or air short-cycling. | Determine cause and correct. |
| | Restriction in liquid tube. | Remove restriction. |
| **Head pressure too low.** | Low refrigerant charge. | Check for leaks, repair, and recharge. |
| **Excessive suction pressure.** | High heat load. | Check for source and eliminate. |
| | Faulty TXV. | 1. Check TXV bulb mounting and secure tightly to suction line.<br>2. Replace TXV if stuck open or closed. |
| | Refrigerant overcharged. | Recover excess refrigerant. |
| **Suction pressure too low.** | Dirty air filter. | Replace filter. |
| | Low refrigerant charge. | Check for leaks, repair, and recharge. |
| | Metering device or low side restricted. | Remove source of restriction. |
| | Faulty TXV. | 1. Check TXV bulb mounting and secure tightly to suction line.<br>2. Replace TXV if stuck open or closed. |
| | Insufficient evaporator airflow. | Increase air quantity. Check filter and replace if necessary. |
| | Temperature too low in conditioned area. | Reset thermostat. |
| | Field-installed filter drier restricted. | Replace. |

LEGEND

**TXV** — Thermostatic Expansion Valve

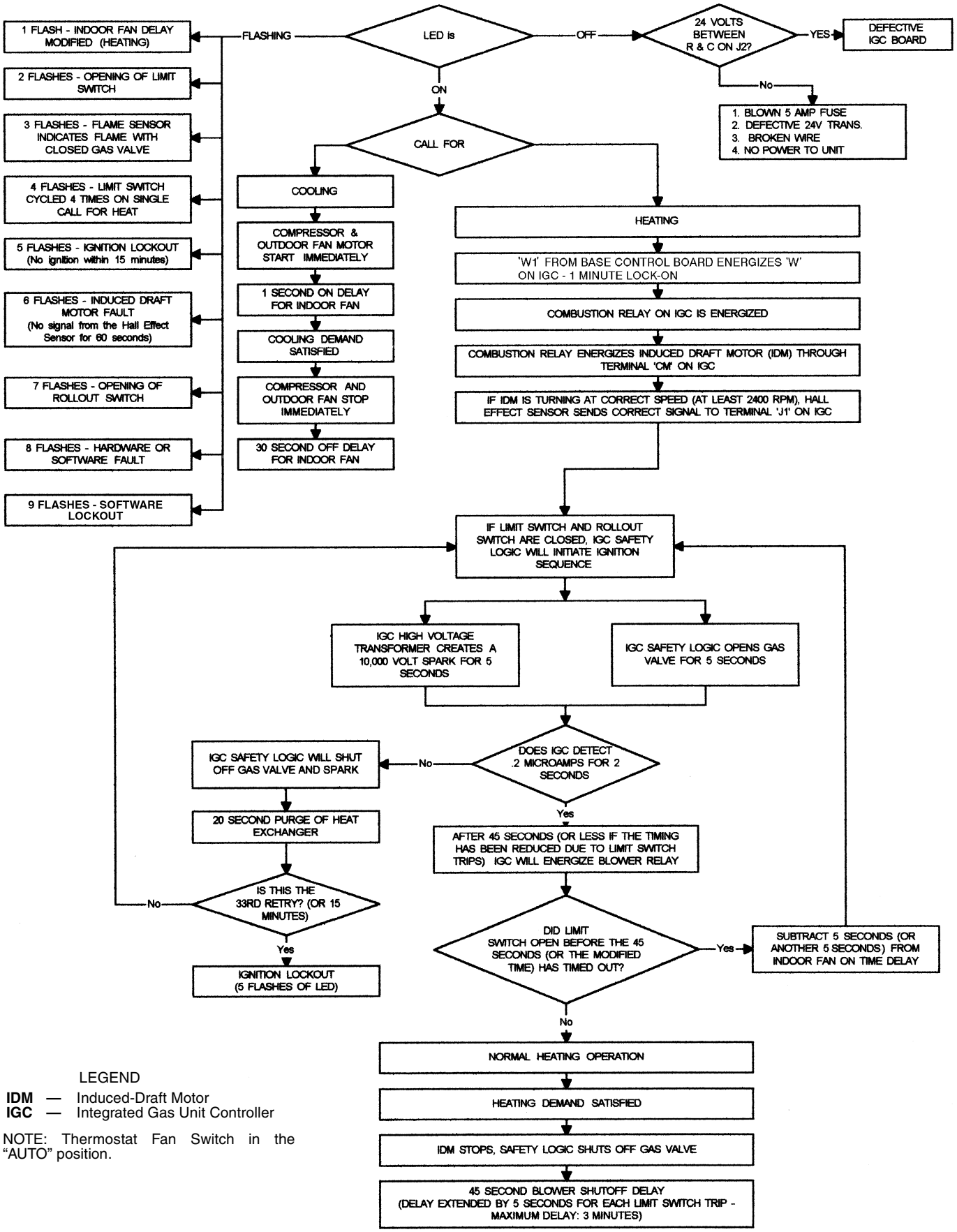
## Table 31 — Heating Service Analysis

| PROBLEM | CAUSE | REMEDY |
|---|---|---|
| **Burners will not ignite.** | Misaligned spark electrodes. | Check flame ignition and sensor electrode positioning. Adjust as needed. |
| | No gas at main burners. | Check gas line for air; purge as necessary. After purging gas line of air, allow gas to dissipate for at least 5 minutes before attempting to relight unit. |
| | | Check gas valve. |
| | Water in gas line. | Drain water and install drip leg to trap water. |
| | No power to furnace. | Check power supply, fuses, wiring, and circuit breaker. |
| | No 24 v power supply to control circuit. | Check transformer. Transformers with internal overcurrent protection require a cool-down period before resetting. Check 24-v circuit breaker; reset if necessary. |
| | Miswired or loose connections. | Check all wiring and wire nut connections. |
| | Burned-out heat anticipator in thermostat. | Replace thermostat. |
| | Broken thermostat wires. | Run continuity check. Replace wires if necessary. |
| **Inadequate heating.** | Dirty air filter. | Clean or replace filter as necessary. |
| | Gas input to unit too low. | Check gas pressure at manifold. Clock gas meter for input. If too low, increase manifold pressure or replace with correct orifices. |
| | Unit undersized for application. | Replace with proper unit or add additional unit. |
| | Restricted airflow. | Clean filter, replace filter, or remove any restrictions. |
| | Blower speed too low. | Install alternate motor, if applicable, or adjust pulley to increase fan speed. |
| | Limit switch cycles main burners. | Check rotation of blower, thermostat heat anticipator settings, and temperature rise of unit. Adjust as needed. |
| | Too much outdoor air. | Adjust minimum position. |
| | | Check economizer operation. |
| **Poor flame characteristics.** | Incomplete combustion (lack of combustion air) results in: | Check all screws around flue outlets and burner compartment. Tighten as necessary. |
| | Aldehyde odors, CO, sooting flame, or floating flame. | Cracked heat exchanger. |
| | | Overfired unit — reduce input, change orifices, or adjust gas line or manifold pressure. |
| | | Check vent for restriction. Clean as necessary. |
| | | Check orifice to burner alignment. |
| **Burners will not turn off.** | Unit is locked into Heating mode for a one minute minimum. | Wait until mandatory one minute time period has elapsed or cycle power to unit. |

LEGEND

**GR** — Ground

Refer to Fig. 39 for IGC troubleshooting information.


LED is
FLASHING
OFF
ON
1 FLASH - INDOOR FAN DELAY MODIFIED (HEATING)
2 FLASHES - OPENING OF LIMIT SWITCH
3 FLASHES - FLAME SENSOR INDICATES FLAME WITH CLOSED GAS VALVE
4 FLASHES - LIMIT SWITCH CYCLED 4 TIMES ON SINGLE CALL FOR HEAT
5 FLASHES - IGNITION LOCKOUT (No ignition within 15 minutes)
6 FLASHES - INDUCED DRAFT MOTOR FAULT (No signal from the Hall Effect Sensor for 60 seconds)
7 FLASHES - OPENING OF ROLLOUT SWITCH
8 FLASHES - HARDWARE OR SOFTWARE FAULT
9 FLASHES - SOFTWARE LOCKOUT
24 VOLTS BETWEEN R & C ON J2?
YES
DEFECTIVE IGC BOARD
No
1. BLOWN 5 AMP FUSE
2. DEFECTIVE 24V TRANS.
3. BROKEN WIRE
4. NO POWER TO UNIT
CALL FOR
COOLING
COMPRESSOR & OUTDOOR FAN MOTOR START IMMEDIATELY
1 SECOND ON DELAY FOR INDOOR FAN
COOLING DEMAND SATISFIED
COMPRESSOR AND OUTDOOR FAN STOP IMMEDIATELY
30 SECOND OFF DELAY FOR INDOOR FAN
HEATING
'W1' FROM BASE CONTROL BOARD ENERGIZES 'W' ON IGC - 1 MINUTE LOCK-ON
COMBUSTION RELAY ON IGC IS ENERGIZED
COMBUSTION RELAY ENERGIZES INDUCED DRAFT MOTOR (IDM) THROUGH TERMINAL 'CM' ON IGC
IF IDM IS TURNING AT CORRECT SPEED (AT LEAST 2400 RPM), HALL EFFECT SENSOR SENDS CORRECT SIGNAL TO TERMINAL 'J1' ON IGC
IF LIMIT SWITCH AND ROLLOUT SWITCH ARE CLOSED, IGC SAFETY LOGIC WILL INITIATE IGNITION SEQUENCE
IGC HIGH VOLTAGE TRANSFORMER CREATES A 10,000 VOLT SPARK FOR 5 SECONDS
IGC SAFETY LOGIC OPENS GAS VALVE FOR 5 SECONDS
DOES IGC DETECT .2 MICROAMPS FOR 2 SECONDS
No
IGC SAFETY LOGIC WILL SHUT OFF GAS VALVE AND SPARK
20 SECOND PURGE OF HEAT EXCHANGER
IS THIS THE 33RD RETRY? (OR 15 MINUTES)
No
Yes
IGNITION LOCKOUT (5 FLASHES OF LED)
Yes
AFTER 45 SECONDS (OR LESS IF THE TIMING HAS BEEN REDUCED DUE TO LIMIT SWITCH TRIPS) IGC WILL ENERGIZE BLOWER RELAY
DID LIMIT SWITCH OPEN BEFORE THE 45 SECONDS (OR THE MODIFIED TIME) HAS TIMED OUT?
Yes
SUBTRACT 5 SECONDS (OR ANOTHER 5 SECONDS) FROM INDOOR FAN ON TIME DELAY
No
NORMAL HEATING OPERATION
HEATING DEMAND SATISFIED
IDM STOPS, SAFETY LOGIC SHUTS OFF GAS VALVE
45 SECOND BLOWER SHUTOFF DELAY (DELAY EXTENDED BY 5 SECONDS FOR EACH LIMIT SWITCH TRIP - MAXIMUM DELAY: 3 MINUTES)

LEGEND

**IDM** — Induced-Draft Motor
**IGC** — Integrated Gas Unit Controller

NOTE: Thermostat Fan Switch in the "AUTO" position.

**Fig. 39 — IGC Control (Heating and Cooling)**

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# START-UP CHECKLIST

MODEL NO.:_____ SERIAL NO.:_____

DATE:_____ TECHNICIAN: _____

## I. PRE-START-UP:

- ☐ VERIFY THAT ALL PACKING MATERIALS HAVE BEEN REMOVED FROM UNIT
- ☐ VERIFY INSTALLATION OF OUTDOOR AIR HOOD
- ☐ VERIFY INSTALLATION OF FLUE EXHAUST AND INLET HOOD
- ☐ VERIFY THAT CONDENSATE CONNECTION IS INSTALLED PER INSTRUCTIONS
- ☐ VERIFY THAT ALL ELECTRICAL CONNECTIONS AND TERMINALS ARE TIGHT
- ☐ VERIFY GAS PRESSURE TO UNIT GAS VALVE IS WITHIN SPECIFIED RANGE
- ☐ CHECK GAS PIPING FOR LEAKS
- ☐ CHECK THAT INDOOR-AIR FILTERS ARE CLEAN AND IN PLACE
- ☐ CHECK THAT OUTDOOR AIR INLET SCREENS ARE IN PLACE
- ☐ VERIFY THAT UNIT IS LEVEL
- ☐ CHECK FAN WHEEL AND PROPELLER FOR LOCATION IN HOUSING/ORIFICE, AND VERIFY SETSCREW IS TIGHT
- ☐ VERIFY THAT FAN SHEAVES ARE ALIGNED AND BELTS ARE PROPERLY TENSIONED
- ☐ VERIFY THAT SCROLL COMPRESSORS ARE ROTATING IN THE CORRECT DIRECTION
- ☐ VERIFY INSTALLATION OF THERMOSTAT/SPACE SENSOR
- ☐ VERIFY SET UP OF ELECTRONIC CONTROLS (REFER TO CONTROLS AND TROUBLESHOOTING GUIDE)
- ☐ VERIFY THAT CRANKCASE HEATERS HAVE BEEN ENERGIZED FOR AT LEAST 24 HOURS

## II. START-UP

### ELECTRICAL

SUPPLY VOLTAGE L1-L2 _____ L2-L3 _____ L3-L1 _____

COMPRESSOR AMPS — COMPRESSOR A1 L1 _____ L2 _____ L3 _____

— COMPRESSOR B1 L1 _____ L2 _____ L3 _____

— COMPRESSOR C1 (016-024 ONLY) L1 _____ L2 _____ L3 _____

SUPPLY FAN AMPS _____

### TEMPERATURES

OUTDOOR-AIR TEMPERATURE _____ F DB (Dry Bulb)

RETURN-AIR TEMPERATURE _____ F DB _____ F WB (Wet Bulb)

COOLING SUPPLY AIR _____ F

GAS HEAT SUPPLY AIR _____ F

### PRESSURES

GAS INLET PRESSURE _____ IN. WG

GAS MANIFOLD PRESSURE STAGE NO. 1 _____ IN. WG STAGE NO. 2 _____ IN. WG

REFRIGERANT SUCTION CIRCUIT A _____ PSIG

CIRCUIT B _____ PSIG

CIRCUIT C _____ PSIG (016-024 ONLY)

REFRIGERANT DISCHARGE CIRCUIT A _____ PSIG

CIRCUIT B _____ PSIG

CIRCUIT C _____ PSIG (016-024 ONLY)

☐ VERIFY REFRIGERANT CHARGE USING CHARGING CHARTS ON PAGE 44

### GENERAL

☐ ECONOMIZER MINIMUM VENT AND CHANGEOVER SETTINGS TO JOB REQUIREMENTS

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE

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